Vol. 27 No. 8 August 1992

Food Technology Abstracts

Central Food Technological Research Institute, Mysore.

National Information System for Science and Technology
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FOOD TECHNOLOGY ABSTRACTS

Vol. 27 No. 8
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ABBREVIATIONS

A	ampere
AAS	atomic absorption Spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc
ECD.	electron capture detection
EDTA	ethylenediaminetetra acetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto-[10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycle/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lb	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt	.molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [kg m/s^2]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
P	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	south, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
w	watt
W.	West,Western,etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt	weight
yd	yard
yr	year
µ	micro-[as in g, m]
%:	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

Language of text	
Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
spanish	Es
swedish	Sv

GENERAL

1535

Sharma (SK). **Status of processed food exports.** *ISI Bulletin* 5(9): 1991: 321-323

Article covers status of Indian food industry, the export figures of fruits and vegetables, meat and other processed foods, the list of countries importing Indian foods and the possibilities of exploring the EEC for exporting processed foods. SRA

FOOD PROCESSING

1536

Macku (C) and Shibamoto (T). **Application of simultaneous purging and solvent extraction technique for flavour monitoring of natural products.** *Food Chemistry* 42(2): 1991: 121-127

Volatiles from bananas during ripening was investigated by a newly developed purging cum solvent-extraction apparatus. Five alkylacetates and five alkylbutyrates, responsible for characteristic flavour, increased during ripening. After 10 days, at fruits senescence period, ester formation reached max. Three alkyl increased for 5 days and plateaued until late senesence stages. Similarly fresh celery volatiles analysed by the same apparatus gave 14 terpenes and two aromatic compounds in the headspace sample. SD

FOOD PACKAGING

Packaging materials

Plastics

1537

Wille (G). **Plastic materials for wrapping of foodstuffs in progress.** *Lebensmittelindustrie* 37(5): 1990: 205 (De)

Polyethylene foil

1538

Steiner (I). **Changes of a polyethylene foil for food packing after sterilization with ozone.** *Deutsche Lebensmittel-Rundschau* 87(4): 1991: 107-112 (De)

The effect of ozone sterilizing a foil for food packaging made of polyethylene on the foil itself and respectively on the antioxidants BHT and BHA was examined. The pentane extracts of the foil were analyzed by HPTLC preparative TLC with follwing IR spectroscopy of the isolated substances and GC/MS. The foil itself was analyzed by IR and microscopic methods. Beside oxidation products of BHT and BHA phthalic acid esters, alkanes, alkenes, ketones, peroxides and other substances which may cause off-flavour were found. A mechanical damage of the foil could not be proved. AS

FOOD ENGINEERING AND EQUIPMENT

1539

Silva (C), Hendrickx (M), Oliveira (F) and Tobback (P). **Optimal sterilization temperatures for conduction heating foods considering finite surface heat transfer coefficients.** *Journal of Food Science* 57(3): 1992: 743-748

Optimal sterilization temp. are defined as the processing temp. which result in a min surface cook-value after achieving the desired degree of sterility. They were calculated as a function of product heating rate, surface heat transfer coeff., initial food temp., heating medium come-up-time, z-value for the quality factor and target F_0-value. Different one-dimensional heat transfer shapes were considered. Compared to the other variables, initial temp. and heating medium come-up-time had little influence on optimal processing temp. Regression equations were developed relating optimal temp. with all relevant variables. SRA

1540

Stoforos (NG) and Merson (RL). **Physical property and rotational speed effects on heat transfer in axially rotating liquid/particluate canned foods.** *Journal of Food Science* 57(3): 1992: 749-754

Particle surface temp. were measured by liquid crystals that allowed unrestricted motion of the monitored particles. Liquid-particle film heat transfer coeff. (h_p) were considerably higher than published values which were determined with particles attached to thermocouple wires. In general, as a result of the particle motion, h_p increased with increasing rotational speed and increasing fluid viscosity. Furthermore, h_p values were higher for Teflon spheres than for Al spheres. Results for the overall (heating medium/container wall/internal liquid) heat transfer coeff. were consistent with published observations. SRA

1541

Rahul Gupta. **Use of liquid nitrogen to freeze in the freshness.** *Seafood Export Journal* 24(2): 1992: 33-39

Liquid nitrogen (LN) with its instant and extreme cold makes freezing and chilling of food faster, more controllable, economical and does not effect the food quality. The quality of LN as a refrigerant and the methods of LN application including spraying on the product using tunnel freezer, vaporizing the liquid in a forced draught and below the cold vapour over food using spiral freezer or batch freezer and immersion of the product in liquid using immersion freezer techniques are described. The operation of freezing tunnel is described in detail and the benefits derived are listed. A comparison of operating costs is also made between LN and mechanical system (fluidised bed). SRA

ENERGY IN FOOD PROCESSING

1542

Kluge (C) and Linke (L). **Consumption of heat energy for blanching.** *Lebensmittelindustrie* 37(5): 1990: 214-217 (De)

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1543

Izzo (HV) and Ho (C-T). **Ammonia affects Maillard chemistry of an extruded autolyzed yeast extract: Pyrazine aroma generation and brown colour formation.** *Journal of Food Science* 57(3): 1992: 657-659, 674

The effect of ammonia was studied by extruding mixtures of autolyzed yeast extract, glucose and ammonium bicarbonate. The resulting extrudates were compared for degree of roast aroma generation by analysis of the pyrazine volatiles formed. In addition, the overall extent of the browning reaction was measured by monitoring brown colour formation. Samples which contained ammonia exhibited a greater degree of brown colour formation: however, ammonia adversely affected the total amount of pyrazines generated. The reactive nature of the free ammonia molecule was suspected to be the governing causative factor. AS

1544

Bell (LN) and Labuza (TP). **Compositional influence on the pH of reduced-moisture solutions.** *Journal of Food Science* 57(3): 1992: 732-734

The pH of reduced-moisture systems is not the same as in hydrated systems. As aqueous phosphate buffer solutions become conc., the pH of the system decreases. The pH of citrate buffer solutions decreases, then increases as the concn. increases. Identical buffer solutions whose a_w is reduced by the addition of nonionic solutes indicate no correlation of pH with either the a_w reduction or the change in dielectric constant. The response of pH to added solutes appears to be independent on the chemical nature of the solute and its interaction with water. This study also confirmed the limitations of several theoretical models of ionic activities. AS

1545

Slade (L) and Levine (H). **Beyond water activity: Recent advances based on an alternative approach to the assessment of food quality and safety.** *CRC Critical Reviews in Food Science and Nutrition* 30(2/3): 1991: 115-360

This review describes the concept of water dynamics and its basis as a central element of a framework based on a "food polymer science" approach to the study of structure-property relationships in food products and processes. Article covers historical backgrounds: shortcomings of the traditional approach based on the concept of a_w, an alternative approach to moisture management in food systems, the food polymer science databank and its physicochemical foundation, interpretations based on the food polymer science approach: new thoughts about old moisture management questions, conclusions and future prospects. 443 references. SRA

1546

Schultz (M), Schmidt (G) and Schmandke (H). **Effects of low methoxy pectin on protein stabilized o/w emulsions.** *Die Nahrung* 34(5): 1990: 443-447

The interaction between low methoxy pectin and faba bean globulin or the corresponding acetylated derivative in o/w emulsions is indicated by formation of hydrogen ions. For the globulin this process reaches a max within 1 day: in the case of the acetylated globulin that is valid within 6 days. These findings are related to the fact that the stability of globulin stabilized emulsions increases as a result of pectin addition whereas in acetylated globulin stabilized emulsions pectin addition leads to a decrease in stability. AS

1547

Ayyad (K), Hassanien (F) and Ragab (M). **The effect of γ-irradiation on the structure of pectin.** *Die Nahrung* 34(5): 1990: 465-468

The effect of γ-irradiation on the anhydrouronic acid (AUA) content, degree of ester methyl, MW and MW

distribution in addition to the ability to form gel in the presence of sugar and acid is studied. At dose of 2 kGy, a slight increase in the AUA content was noticed. A dramatic decrease in the MW as calculated viscometrically or from the HPGPC-elution profile was found. BV

Chemistry (Analytical)

1548

Ewing (DD) and Stepanik (TM). **Inefffectiveness of a fluorometric method for identifying irradiated food based on thymine glycol.** *Journal of Food Science* 57(3): 1992: 660-663

Under the experimental conditions employed, the fluorometric assay for thymine glycol was not suitable for detecting irradiated chicken breast meat. The method lacked both specificity (the excess O-ABA present contributed to the fluorescence signal measured) and sensitivity. SRA

1549

Beavis (R). **New methods in the mass spectrometry of proteins.** *Trends in Food Science and Technology* 2(10): 1991: 251-253

The technological bases of electrospray ionization and matrix-assisted laser desorption and practical aspects of using the methods to analyse polypeptides and proteins are the aspects reviewed in this article. 21 references. BV

1550

Ackermann (Th). **Fast chromatographic study of propolis crudes.** *Food Chemistry* 42(2): 1991: 135-138

TLC method developed to test crude preparations and their popular ethanolic extracts showed significant differences in the pattern useful for their further identification as well as their isolation. SD

1551

Asensio (JS), Barrio (CS), Juez (MTG) and Bernal (JG). **Study of the decay of diazinon and chlorpyrifos in apple samples, using gas chromatography.** *Food Chemistry* 42(2): 1991: 213-224

GC analysis (capillary column, NPD detector) in the laboratory with apple samples treated with commercial pesticides (*in vitro*) and with apple on the tree (*in vivo*) showed that both pesticides degraded more quickly *in vivo* and without penetrating the fruit in both. SD

1552

Ross (T) and McMeekin (TA). **Prediction microbiology.** *Food Australia* 43(5): 1991: 202-207

The principles and potential of predictive microbiology are illustrated by a mathematical model of square root type which predicts the growth of *Staphylococcus aureus* on seafoods. The potential also exists for remote assessment by use of modern facilities. SRA

Enzymes

1553

Leuchtenberger (A). **Current facilities using enzymes in food production. Part I.: General aspects and common fields of application.** *Ernahrungsforschung* 35(6): 1990: 189-192 (De)

Recent developments in preparations and application of enzymes in industrial food processing and production are discussed with regard to starch, dairy, fat, oil, fruit and vegetable processing as well as the production of bakery goods, alcohol and beer. BV

Glucoamylases

1554

Toldra (F), Jansen (NB) and Tsao (GT). **Maltose hydrolysis kinetics with glucoamylase immobilized in porous glass fibers in tubular flow reactor.** *Die Nahrung* 34(10): 1990: 945-951

Glucoamylase has been covalently immobilized in controlled pore glass fibers packed parallel to the axis of a tubular reactor. Flow kinetic studies have been carried out for a range of flow rates and substrate concn. at 50 C and pH 4.5. Diffusion control has been found negligible with high flow rates and substrate concn. The apparent MICHAELIS constant was three orders of magnitude higher than that of the free enzyme. As flow rate and substrate concn. decrease, the extent of diffusion control increased up to a moderate degree. The immobilized glucoamylase was more stable than the free enzyme when incubated at 50 C. AS

Ethyl alcohol

1555

Kohler (K). **International status and trends of the application of raw materials for the production of**

ethanol by fermentation. *Lebensmittelindustrie* 37(5): 1990: 208-210 (De)

Microorganisms

Bacteria

Lactobacillus plantarum

1556

Garcera (MJG), Campos (M), Zuniga (M) and Uruburu (F). **Growth and metabolism of L-malic acid by *Lactobacillus plantarum* CECT 220 in a defined medium.** *Journal of Food Science* 57(3): 1992: 778-780

Malic acid can be metabolized by lactic acid bacteria by two main pathways. Previous studies in malic acid degradation by malic and malolactic enzymes in wines and complex media have not been carried out in completely defined media. Some novel aspects of growth and metabolism of a *L. plantarum* strain in a defined medium were found. One of the most relevant results was that the strain could grow with malate as sole energy source added to the medium. AS

Yersinia enterocolitica

1557

Gola (S),Scaramuzza (N), Quintavalla (S) and Campanini (M). **Combined effect of pH and a_w on the growth of *Yersinia enterocolitica* at different refrigeration temperatures.** *Industria Conserve* 66(2): 1991: 112-116 (It)

The combined effect of pH and a_w on a pool of 4 *Yersinia enterocolitica* strains in culture medium, at different refrigeration temp. (2, 4 and 8 C) and inoculum levels (10 - 10^5 cells/ml) was studied. With an inoculum of 10^5 cells/ml, min pH value for growth was found to be 4.1 at a_w = 0.99 and 8 C, while min a_w value at pH = 7.0 was 0.957 at 8 and 4 C and 0.971 at 2 C. Growth inhibition was observed with the following pH/a_w combinations: at 8 C, pH 4.5/a_w 0.971, pH 5.1 - 5.5/a_w 0.957, pH 6-7/a_w 0.948; at 4 C, pH 5.1-5.5/a_w 0.971, pH 6/a_w 0.957, pH 7/a_w 0.948; at 2 C, pH 5.1-5.5/a_w 0.971, pH 6-7/a_w 0.957. The ability of *Y. enterocolitica* to grow and survive at -1 C was evaluated as a function of combined pH/a_w. Results showed that the bacterium could grow at this temp. in about 130 days at pH 5.1/a_w 0.995 and pH 7/a_w 0.971. AS

Fungi

Mushrooms

1558

Brunner (KG) and Wongg (ACL). ***Staphylococcus aureus* growth and enterotoxin production in mushrooms.** *Journal of Food Science* 57(3): 1992: 700-703

Staphylococcus aureus strain FRI-100 inoculated onto mushrooms and incubated under simulated pre- and post-canning conditions, grew and produced staphylococcal enterotoxin A (SEA) at 25 C in 10% to 20% NaCl. Growth and SEA production occurred when mushrooms were stored in plastic bags at 37 C but not at 25 C. Mushrooms heat-processed at 121 C supported *S. aureus* growth and SEA production. No SEA was recovered from mushrooms inoculated with 1 or 10 ng SEA/g and heated at 121.1 C for 4.5 min. At higher inoculated SEA levels (100 and 1,000 ng/g), SEA was detectable after 10 min of heating. A more probable route of enterotoxin contamination in through post-process leakage. BV

1559

Mau (J-L), Beelman (RB) and Ziegler (GR). **1-Octen-3-ol in the cultivated mushroom, *Agaricus bisporus*.** *Journal of Food Science* 57(3): 1992: 704-706

The optimal activity of lipoxygenase-hydroperoxide lyase enzymes for 1-octen-3-ol formation was observed in cultivated mushroom over the pH range 5.0 to 7.0. The highest amount of 1-octen-3-ol was produced at pH 6.0. During post-harvest storage at 121 C, enzyme activity and 1-octen-3-ol content decreased over time. BV

1560

Fasidi (IO) and Kadiri (M). **Changes in nutrient contents of two Nigerian mushrooms, *Termitomyces robustus* (Beeli) Heim and *Lentinus subnudus* Berk, during sporophore development.** *Die Nahrung* 34(5): 1990: 415-420

Hygiene

1561

Ottaviani (F). **Microbial contamination of food contact surfaces in the food industry.** *Industrie Alimentari* 30(295): 1991: 635-641 (It)

Efficiency of sanitation in meat and soft cheese factories has been tested through the parallel monitoring of residual bacteria and residual proteins onto food contact surfaces by means of: (i) TVC on standard culture media, (ii) ATP measurement by the BioOrbit bioluminometric assay, and (iii) proteins semiquantitative detection

by rapid strips (Albustix, Ames). ATP measurement is a good index of the "overall collection" of sanitized surfaces; even if not exactly correlating to microbial biomass (because of the interference of disinfectants-related sublethal stresses, which lower the light output, and of animal cells, which raise the light output) it immediately gives a reliable picture of the sanitation efficiency. AS

BIOTECHNOLOGY

1562

Kabaktschieva (G), Antanasov (W), Dimitrova (T), Atev (A) and Peev (P). **Biotechnological and technological studies with the new Bulgarian hydrolase enzyme product "Trichocease SU-2".** *Die Nahrung* 34(5): 1990: 407-413 (De)

The application of 0.20 - 0.25 Kg of "Trichocease SU" per 1000 Kg malt the lautering time of first wort and last running is reduced. The content of β-glucan and the viscosity are decreased and the amount of fermentable sugar is increased. BV

TISSUE CULTURE

Nil

FOOD ADDITIVES

Colourants

1563

Shi (Z), Lin (M) and Francis (FJ). **Stability of anthocyanins from *Tradescantia pallida*.** *Journal of Food Science* 57(3): 1992: 758-760, 770

The acylated, B-ring substituted anthocyanins of *Tradescantia pallida* (TPA) were extracted from the leaves with acidic water, purified on a Duolite-861 resin and incorporated into a model beverage. The beverage was composed of a citrate-phosphate buffer at pH values 3.5, 4.5 or 5.5, and 15% sucrose. Comparison samples contained cyanidin-3-glucoside from blackberries and a commercial sample of enocyanin from grapes. The TPA samples were much more stable than the other two, particularly at the higher pH values as judged by pigment retention and tristimulus colour readings. The extra absorption band of the TPA samples at pH 5.5 indicated the samples were well coloured. Addition of tannin and/or ascorbic acid resulted in marked pigment and colour loss. AS

1564

Shi (Z), Lin (M) and Francis (FJ). **Anthocyanins of *Tradescantia pallida*. Potential food colorants.** *Journal of Food Science* 57(3): 1992: 761-765

Tradescantia pallida (syn: Setcreasea *purpurea*) contained two major anthocyanins. One was cyanidin-3,7,3^{1}-triglucoside with 3 molecules of ferulic acid and an extra terminal glucose. The other pigment was similar but without the terminal glucose unit. The nonacyl portion was identified by comparison with the pigment of *Zebrina pendula*. The acyl/aglycone and acyl/sugar ratios were determined by using internal standards and response factors with HPLC. The pigments may have potential as food colorants. AS

1565

Lin (M), Shi (Z) and Francis (FJ). **A simple method of analysis for *Tradescantia* anthocyanins.** *Journal of Food Science* 57(3): 1992: 766-767

Acylated B-ring substituted anthocyanins with a 4^{1}-keto structure may be of interest as food colorants because at pH values above 4.0 they show an extra absorption band at 583 nm. This makes the pigments highly colored at pH > 4.0. The extra band also provides a simple method of analysis based on the difference between the absorption at 583 nm at pH 5.5 and 2.0. The ΔE 1% 1 cm for the major anthocyanin in *Tradescantia pallida* was 97. AS

1566

Shi (Z), Francis (FJ) and Duan (H). **Quantitative comparison of the stability of anthocyanins from *Brassica oleracea* and *Tradescantia pallida* in non-sugar drink model and protein model systems.** *Journal of Food Science* 57(3): 1992: 768-770

The *Tradescantia pallida* anthocyanins were about 29 times more stable in a nonsugar drink model system than red cabbage (*Brassica oleracea*) anthocyanins, and 15 times in a fish protein system. The degradation of the anthocyanins from both sources in a nonsugar drink model was logarithmic rather than linear. The mechanism for logarithmic relationship was assumed to be the difficulty of water molecules diffusion to the hydrophobic center formed by the acyl groups and the aglycone. AS

Dyes

1567

Mastowska (J) and Janiak (J). **Studies on electrochemical reduction of the food dye**

cochineal red. *Deutsche Lebensmittel-Rundschau* 87(4): 1991: 114-116

Using the method of differential pulse polarography (DPP), the effect of pH and concn. on the reduction waves of cochineal red, the main food dye, has been examined. The mechanism of reduction of this dye on the static mercury electrode has been proposed. Using the linear dependence of polarographic peak current (i) on dye concn. (c), a procedure has been developed for its quantitative detn. by the DPP method. AS

Stabilizers

Larch gum

1568

Chai (E), Stephens (L), Prescott (J) and Lane (A). **Does larch gum enhance sweetness ?.** *Food Australia* 43(7): 1991: 302-303

Panel trails demonstrated that larch gum arabinogalactan had no effect on the sweetness of sucrose or on the sweetness, pleasantness or bitter after-taste of saccharin or aspartame at concn. of either 0.007 or 2.0% (w/v). SRA

CEREALS

1569

Mongeau (R), Brassard (R), Malcolm (S) and Shah (BG). **Effect of dietary cereal brans on body weight and blood lipids in a long-term rat experiment.** *Cereal Chemistry* 68(5): 1991: 448-453

Male and female Sprague-Dawley rats were fed diets containing purified cellulose, oat bran, hard wheat bran, soft wheat bran, corn bran, or rodent lab chow at 4 or 14% total dietary fiber, and their growth and blood lipids were examined after 8 and 29 wks. Rats from each group were killed during wks 8 or 29, and tissues were collected. Diets had only a transient effect on body wt. gain, and differences were not significant at wk 29. Females had higher serum lipid levels than males at wk 29. Cholesterol levels were higher in males fed soft rather than hard wheat bran. The oat bran diet (4% fiber) mostly induced lower levels of high-density lipoprotein cholesterol than did the wheat bran diets (14% fiber). In conclusion, cereal brans had no long-term effect on body wt., but each influenced total serum lipid levels and intestinal wt. differently. AS

1570

Wood (PJ), Weisz (J) and Mahn (W). **Molecular characterization of cereal β-glucans. II. Size-exclusion chromatography for comparison of molecular weight.** *Cereal Chemistry* 68(5): 1991: 530-536

Cereal (1-3),(1-4)-β-D-glucan (β-glucan) and pullulan standards were fractionated by size-exclusion chromatography (SEC) using a HPLC gel column (TSK-60). The β-glucans were used to calibrate the column after their mol. wt. was determined by SEC with low-angle laser-light-scattering detection. Using pH 10 sodium carbonate buffer at 60 C, β-glucan was extracted from the groats and brans of 4 cvs of oats, 4 barley cvs, 4 malts, 4 wheats and 1 rye sample. Some commercial products were also analyzed. The increase in fluorescence intensity of Calcoflour in the presence of β-glucan was used for peak detection, allowing direct chromatography of the crude extracts. β-Glucans from the oat cvs and brans had the highest mol. wt. (3.00×10^6), and commercially milled samples were similar (2.70×10^6), followed by barley (2.14×10^6), malts (1.22×10^6), and rye (1.13×10^6). Wheat β-glucan was not sufficiently solubilized for detection. β-Glucan in ready-to-eat breakfast cereals ranged in mol. wt. from 0.60 to 2.93×10^6. The method was used to monitor changes in mol. wt. of β-glucan through the digestive tract of the rat. AS

1571

Ranhotra (GS), Gelroth (JA), Glaser (BK) and Rao (CS). **Fecal bulking effect of whole grain flour from selected grains.** *Cereal Chemistry* 68(5): 1991: 556-558

In a 4-wk study, young rats were fed diets containing whole grain flour from wheat, oats, rye, or barley. At the 50% level used, these diets provided a total of 1.6, 3.0, 3.5 and 10.4 g of soluble fiber (SF) and 17.0, 10.6, 17.5 and 45.1 g of total dietary fiber (TDF), respectively. Two groups of rats were fed SF-free diets (cellulose-based) that provided 10.5 or 44.9 g of TDF. Fecal dry wt. in the grain-fed rats averaged 22.6 (wheat-fed), 15.2 (oat-fed), 20.9 (rye-fed) or 44.9 (barley-fed) g for the 4-wk period. These were poorly correlated with SF intakes but highly correlated with TDF ($r = 0.97$) and insoluble fiber ($r = 1.00$). Fecal densities were significantly lower in rats fed cellulose- or wheat-based diets than in rats fed comparable (based on TDF intake) diets based on the other three grains. AS

1572

Hekkens (WThJM) and van Twist-De Graaf (M). **What is gluten-free-levels and tolerances in the gluten-free diet ?.** *Die Nahrung* 34(5): 1990: 483-487

1573

Gerstenkorn (P), Weipert (D), El Baya (AW), Munzing (K), Meyer (D), Zwingelberg (H). **Alterations of grain quality during storage.** *Getreide-Mehl und Brot* 44(4): 1990: 104-111 (De)

Barley

1574

Ranhotra (GS), Gelroth (JA), Astroth (K) and Bhatty (RS). **Relative lipidemic responses in rats fed barley and oat meals and their fractions.** *Cereal Chemistry* 68(5): 1991: 548-551

Whole meal, bran and flour from three barly genotypes, which contained graded levels of soluble fiber, were compared with similar commercial fractions of oats for their effect on blood cholesterol (CH), triglycerides, high-density lipoprotein (HDL) CH, and liver CH (test model, using hypercholesterolemic rats). Whole meals of the three barley genotypes contained 3.0, 5.2 or 6.8% soluble fiber; oatmeal contained 3.0%. In meal-fed rats, barley genotypes did not show a favourable blood or liver lipid response compared with oats. However, in bran- and flour-fed rats, the data showed that barley exerted a profound blood and liver CH-lowering effect compared with oat bran or flour (blood triglyceride levels were minimally affected). Blood HDL-CH levels were appreciably elevated in rats fed barley bran or flour compared with oat bran or flour. These results suggested that barley and its major fractions (bran and flour) may evoke different lipidemic responses and that barley bran and flour have a more favourable effect on blood lipids than do oat bran and flour. AS

1575

Jeremias (M), Nagel (A) and Ledl (F). **Detection of gibberellic acid in barley malt.** *Deutsche Lebensmittel-Rundschau* 87(4): 1991: 103-106 (De)

Rice

1576

Kaushik (RP) and Khush (GS). **Endosperm mutants in rice: Gene expression in Japonica and Indica backgrounds.** *Cereal Chemistry* 68(5): 1991: 487-491

Dull, sugary, shrunken, floury, white-core and amylsoe extender endosperm mutants induced in Japonica rice var. were transferred to IR36, and indica var., after two backcrosses. Differential pollen staining was used to select heterozygotes among low-amylose (dull) mutants and the high-amylose recurrent parent (IR36). Segregation distortion was observed in some mutants during gene transfer from japonica to IR36. Phenotypic expressions of mutant genes in IR36 and japonica background were almost similar. However, shrunken-1, which showed partly chalky and partly translucent endosperm in japonica, was completely chalky in indica background. Floury-2 showed variation in phenotype, depending on the degree of distribution of the translucent fraction. Scanning electron photographs showed no starch granules in the endosperm cells of sugary mutants. All the floury-1 and white-core mutants had intermediate amylose (20 - 25%) in the IR36 background. Floury-2, on the other hand, produced low amylose in both backgrounds. In general, the amylose content of dull mutants was slightly higher in IR36 background. The amylose extender gene increased the amylose content of IR36 from 25% to as high as 40%, an increase of about 60%. AS

1577

Feng (G-H), Chen (M), Kramer (KJ) and Reeck (GR). **α-Amylase inhibitors from rice: Fractionation and selectivity toward insect, mammalian and bacterial α-amylases.** *Cereal Chemistry* 68(5): 1991: 516-521

Rice, a cereal grain in which proteinaceous α-amylase inhibitors have not been well characterized, was found to contain amylase activity and numerous proteinaceous α-amylase inhibitors. Inhibitory activity in crude extracts was best detected after the extracts were heated to inactivate the endogenous amylase activity. A relatively simple procedure was developed to extract α-amylase inhibitors from rice. Rice flour was extracted with 0.15M NaCl, and the crude extract was heated at 70 C for 20 min. A portion of the heat-soluble protein was then precipitated by adding ammonium sulphate to a concn. of 1.8M. Sodium dodecyl sulphate polyacrylamide gel electrophoresis showed that the ammonium sulphate precipitate was composed of relatively small proteins with an apparent molecular mass of approx. 14 kDa. With two-dimensional gel electrophoresis, the ammonium sulphate fraction was resolved into atleast eight proteins, most with pIs between 8 and 9. Further separation was done by reversed-phase high-performance liquid chromatography (RP-HPLC). More than 17 protein peaks were resolved. Individual HPLC fractions were assayed for inhibitory activities toward a group of insect (rice weevil, red flour beetle, confused flour beetle, and yellow mealworm), mammalian (human salivary and porcine pancreatic), and bacterial (*Bacillus*) α-amylases. The results showed that 13 of the HPLC fractions examined contained inhibitors of one or more of the α-amylases tested. Several fractions were selective toward insect α-amylases. Some inhibited only one of the four insect α-amylases,

whereas others inhibited both insect and mammalian α-amylases. None of the fractions inhibited the bacterial α-amylase. AS

Rice flour

1578

Landers (PS), Gbur (EE) and Sharp (RN). **Comparison of two models to predict amylose concentration in rice flours as determined by spectrophotometric assay.** *Cereal Chemistry* 68(5): 1991: 545-548

A spectrophotometric assay was used to test two model for predicting amylose in 16 solutions containing known concn. of amylose and amylopectin and in 10 rice flours of unknown composition. The simple linear regression model based on an amylose-only standard curve over-predicted amylose in all solutions (relative bias of 7 - 329%). The model used for simultaneous estimation of amylose and amylopectin was more accurate with some slight overprediction or underprediction of amylose (< 6%). The amylose-only method predicted amylose content to be 7.4% for waxy flour and 16.4 - 25.4% for nonwaxy var. Defatted flours were measured at 8.0% (waxy) and 18.4 - 29.6% (nonwaxy). Lower amylose content was measured by the simultaneous estimation method. Predictions for the flours were 0% (waxy) and 6.6 - 14.2% (nonwaxy). Defatted flours had 0% (waxy) and 9.8 - 22.0% (nonwaxy). This method resulted in greater accuracy, although use of laboratory time and resources was not changed. AS

Wheat

1579

Kaldy (MS), Rubenthaler (GI), Kereliuk (GR), Berhow (MA) and Vandercook (CE). **Relationships of selected flour constituents to baking quality in soft white wheat.** *Cereal Chemistry* 68(5): 1991: 508-512

Selected constituents of soft white wheat flour samples from various locations were examined and related to baking quality in order to identify those constituents that are associated with end-use quality. Among the selected constituents, the pentosan fractions were found to be inversely correlated with baking quality. Soluble and enzyme-extractable pentosans were negatively associated with cookie diameter. Cake volume was negatively associated with soluble, enzyme-extractable, and total pentosans. AS

1580

Mossor (G) and Skupin (J). **Biochemical characteristics of trypsin inhibitor from wheat grain, β variety.** *Die Nahrung* 34(5): 1990: 431-438

A homogenous trypsin inhibitor from wheat grain has been characterized. It is a protein of mol. wt. 9105 daltons and isoelectric point pI = 9.5. It belongs to arginine type inhibitors. The isolated inhibitor does neither inhibit native proteinases from wheat grain nor α-chymotrypsin, papain and pepsin. However, it inhibits some proteinases from microorganisms and moulds. It is susceptible to the action of hydrogen peroxide. The inhibitory protein consists of all amino acid residues with the largest amount of glutamic acid, proline and arginine and the lowest of histidine and tyrosine, respectively. AS

Wheat flour

1581

Symons (SJ) and Dexter (JE). **Computer analysis of fluorescence for the measurement of flour refinement as determined by flour ash content, flour grade colour, and tristimulus colour measurements.** *Cereal Chemistry* 68(5): 1991: 454-460

Millstreams from repeated pilot-scale millings of a commercially grown No. 1 Canada western red spring wheat used to measure flour refinement when selecting for aleurone and pericarp tissue by fluorescence. Measurements were averaged from 25 full-field fluorescence images using UV excitation for aleurone and blue excitation for pericarp. Pericarp fluorescence was strongly correlated ($r^2 > 0.9$) to the tristimulus colour coordinate L* (brightness) of the flour, flour ash content, and flour grade colour. The regression equations for pericarp fluorescence to all the above refinement indexes were homogenous for replicate millings performed over a one-yr period and were not influenceds by flour age. Aleurone fluorescence was also significantly correlated ($P < 0.05$) to the same flour refinement indexes. With the aleurone measurement procedure, millstreams were segregated into two groups, which made the estimation of flour refinement using aleurone more complex than for pericarp using our system. Variability in the fluorescence measurements and flour refinement indexes associated with operators, experimental design, equipment, flour mositure, and flour particle size were investigated. Tristimulus a* and b* values were highly sensitive to moisture changes in the flour, and b* values sensitive to flour particle size. Tristimulus L* values were slightly sensitive to particle size. Tristimulus L* values were highly sensitive to particle size but insensitive to flour moisture, while relative fluorescence measurements were insensitive to both flour moisture and particle size. Instrumental

variability was associated with our fluorescence methods. AS

1582

Sievert (D), Sapirstein (HD) and Bushuk (W). **Electrophoretic study of some high molecular weight proteins of the acetic acid-insoluble residue of wheat flours.** *Cereal Chemistry* 68(5): 1991: 512-515

Acetic acid-insoluble (residue) protein fractions of flours of seven wheat varieties were studied by sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE). Electrophoretic patterns of unreduced SDS-buffer extracts from flour residue fractions revealed a group of relatively high mol. wt. (HMW) proteins having similar electrophoretic characteristics. The HMW proteins of one var. (Neepawa) were characterized further by two-dimensional SDS-PAGE under nonreducing and reducing conditions. The two-dimensional separation showed that the HMW proteins comprised several subunits. Three of these proteins, designated B-2, B-3 and B-4, share some correspondence with the triplet band protein and appear to be partly composed of four large subunits resolved in pairs with mol. wt. of about 56 and 52 kilodaltons. AS

1583

He (H) and Hoseney (RC). **Differences in gas retention, protein solubility and rheological properties between flours of different baking quality.** *Cereal Chemistry* 68(5): 1991: 526-530

From six hard red winter wheat flours of various baking qualities, CI 12995 and KS 501097 were selected to represent flours of good and poor quality. During breadmaking, the volume of CI 12995 dough was larger than the KS 501097 dough. The biggest difference between the two occurred during oven spring. During baking, the KS 501097 dough started to lose large quantities of CO_2 at 33 C, whereas CO_2 loss was minimal in the CI 12995 dough until 72 C. The protein solubility of heated gluten, which was higher for KS 501097 than for CI 12995, did not change over the temp. range 25-60 C. Dynamic rheological tests of gluten-water dough showed no change in rheological properties over that temp. range for either flour. However, the KS 501097 gluten-water dough had a lower G', and the KS 501097 flour-water dough had higher G' than did the corresponding samples from CI 12995. This showed that KS 501097 had a more extensible gluten but a less extensible dough and suggested that more rheologically effective cross-links or interactions existed within the KS 501097 flour-water dough. AS

1584

Nierle (W), El Baya (AW) and Brummer (JM). **Effect of emulsifying lipids on baking quality of wheat flour.** *FAT Science Technology* 93(8): 1991: 309-314 (De)

Fatty acids, monoglycerides and monoglycerin ethers were tested for their suitability as emulsifiers in bread making. The addition of myristic or palmitic acid did not affect the bread volume. Stearic acid increases the volume of bread, while the addition of oleic acid impairs the volume and the score number of the bread. Monoglycerides improve the quality of the bread. Glycerinmonomyristate has the highest effect, followed by the unsaturated monoglycerides. In these experiments, the glycerinmonooleate and glycerinmonolinoleate had higher effect on the bread volume than glycerinmonopalmitate. It has been found of interest to investigate the effect of adding monoglycerin ethers in relation to baking properties of flour. The addition of rac-1-O-dodecylglycerin and rac-1-O-tetradecylglycerin improved the bread volume for about 15% and 13%. The rac-1-O-octadecylglycerin has lower effect than the monoglycerin ethers with C_{12} and C_{14}. AS

Wheat proteins

Gluten

1585

Freeman (TP), Shelton (DR), Bjerke (JM) and Skierkowski (K). **The ultrastructure of wheat gluten: Variations related to sample preparation.** *Cereal Chemistry* 68(5): 1991: 492-498

Fresh and heated gluten samples were prepared for scanning electron microscopy using a variety of preparation techniques. The ultrastructural characteristics of the wheat glutens were directly correlated with preparation procedures. Dehydration of gluten samples can result in major structural artifacts. Hydrated samples were prepared using a "cryopreparation" technique in which just the surface layer was sublimed. This method greatly reduced the gross artifacts of dehydration, and the hydrated samples showed a three-dimensional spongelike structure similar to that observed in fresh gluten examined with light microscopy. AS

1586

Hammam (H) and Sivik (B). **Fractionation of gluten lipids with supercritical carbon dioxide.** *FAT Science Technology* 93(3): 1991: 104-108

Ethanol extracted gluten lipids have been fractionated with supercritical CO_2 at different pressures and constant temp. The extract contains triglycerides and free fatty acids, and a more conc. fraction of polar lipids is left in the extraction vessel. While both polar and nonpolar lipids are soluble in ethanol, only nonpolar lipids are dissolved by supercritical CO_2. An addition of a small amount of ethanol to the CO_2, can, however, increase the solubility of the polar lipids. AS

MILLETS

Corn

1587

Vasishtha (AK), Madhu Bajpai and Chhaya Singh. **Spectrum variability of seeds and oil composition in Indian maize.** *Journal of the Oil Technologists Association of India* 23(2): 1991: 24-28

23 strains and 5 genetic var. of maize were tested for oil and protein contents, physical and chemical characteristics and acid composition of the oils. The (RHORYD x Vijay) F4 contained lowest oil (3.4%), and highest oil content (8.2%) was in strain Comp. R_2. The protein content was lowest (6.5%) in strain Comp. R_2 and highest (11.6%) was in strain (RHORYD x CM 202 x CM 111) F4. Sp. gr. and saponification values showed minor variations. Iodine value ranged between 105.8 and 114.6. Among the genetic var. (Hunius, Diara, Tarun, Vijai and Navin), Vijai contained highest oil (8.4%) and Hunius had highest protein (11.4%) content. The iodine value ranged between 110.3 in Diara and 113.5 in Hunius and the corresponding acid value ranged between 2.6 and 7.8. The major saturated fatty acids in the strains ranged between 8.4 and 23.4%. In phenotypic correlations, the oil content had significantly negative relationship with protein content in the 23 strains. Refractive index was positively and significantly associated with iodine value and linoleic acid. The range in value of fatty acid content was myristic 0.3 - 1.3%, palmitic 13.3 - 15.3%, stearic 3.6 - 5.1%, arachidic 0.2 - 1.0%, linoleic 41.1 - 48.8% and linolenic 1.5 - 2.3% among the 23 strains and 5 var. SRA

1588

Ortega (EI), Villegas (E), Bjarnason (M) and Short (K). **Changes in dry matter and protein fractions during kernel development of quality protein maize.** *Cereal Chemistry* 68(5): 1991: 482-486

Changes in dry matter, protein fractions, and quality during kernel development of quality protein maize (QPM) as a consequence of the interaction between the opaque-2 (O_2) gene and modifier genes were investigated. Protein quality of QPM (i.e., total protein and zein content, tryptophan and lysine levels, and *in vitro* protein digestibility) was determined at different stages of kernel development for three normal and three QPM populations. Dry-matter accumulations of normal and QPM populations were very similar. QPM contained significantly higher amounts of tryptophan and lysine than did normal maize at early stages of kernel development. Protein-fraction distribution from 14 days after pollination through harvest showed large differences between types of maize, particularly in the prolamin components. Synthesis of zein like polypeptides during kernel development followed a characteristic pattern in the QPM endosperm. Isoelectric focusing of the zein and zein like fraction during kernel development revealed only minor differences, particularly in the zein like components. AS

1589

Wu (YV) and Berquist (RR). **Relation of corn grain density to yields of dry-milling products.** *Cereal Chemistry* 68(5): 1991: 542-544

Grain density of corn is positively correlated with yields of certain dry-milled fractions. Grain hardness of corn determined by density correlated positively with yields of total grits and with second- plus third-break grits ($P < 0.01$), and negatively with yields of degerminator fines, low-fat flour, high-fat flour and total flour ($P < 0.01$). Grain density and percent moisture were found to be negatively correlated. AS

Popcorn

1590

Song (A), Eckhoff (SR), Paulsen (M) and Litchfield (JB). **Effects of kernel size and genotype on popcorn popping volume and number of unpopped kernels.** *Cereal Chemistry* 68(5): 1991: 464-467

Four genotypes of commercial yellow popcorn (proprietary hybrids) were screened with 4.36-, 4.76-, 5.16-, 5.56-, and 5.95-mm (11/64-, 12/64-, 13/64-, 14/64- and 15/64-in) round-hole sieves to generate five size fractions. The five fractions were conditioned in an environmental chamber at 22.2 C and 70% rh, popped in a Cretors Metric Weight Volume Tester at 243 C (250-g samples), and compared to control samples containing kernels of differenct sizes in naturally occurring proportions. The 5.16- to 5.56-mm fraction had the highest popping volume and the lowest number of unpopped kernels (UPKs); the 4.36- to 4.75-mm fraction had the lowest popping volume and the greatest number of UPKs. For one of the var. studied, the difference

between the popping volumes of the size fractions reached as high as 11% (from 40.8 to 45.1 cm^3/g). The popping volume of middle sized kernels of all the var. studied was 2% higher in general than that of the control samples. The av. number of UPKs ranged from 13 to 45. The wt. percentage of UPKs varied from 0.62 to 1.56%. The popping volume of the 5.16- to 5.56-mm fraction of different genotypes varied from 45.1 to 47.2 cm^3/g, and the number of UPKs ranged from 13 to 23. Statistical analyses indicated that the popcorn genotype and kernel size significantly affected the popping volume and the number of UPKs. AS

Sorghum

1591

Singh (U) and Singh (B). **Functional properties of sorghum-peanut composite flour.** *Cereal Chemistry* 68(5): 1991: 460-463

Raw and heat-processed partially defatted peanut flour, sorghum flour, and their composite flour had different functional properties (water and oil absorption, viscosity, gelation, emulsion capacity, nitrogen solubility index [NSI] and protein dispersibility index). Water and oil absorption increased with heat processing; this effect was more pronounced in peanut than in sorghum flour. Sorghum flour samples attained a viscosity peak of 630 BU when raw and 438 BU when heat-processed. Peanut fortification reduced the viscosity peak of sorghum flour. The NSI and emulsion capacity of sorghum flour improved considerably as a result of fortification. Heat-processing reduced the NSI and emulsion capacity of peanut flour and peanut-fortified sorghum flour. The implication of these results will be realized in designing protein-enriched products based on sorghum flour, especially for sorghum-growing regions of the world. AS

1592

Suzuki (H), Hayakawa (S) and Ohtsubo (K). **Effect of extrusion cooking on the nutritive value of proteins in grain sorghum.** *Journal of Japanese Society for Food Science and Technology (Nippon Shokuhin Kogyo Gakkaishi)* 38(6): 1991: 553-555

The nutritive value of sorghum proteins increased after extrusion cooking. An extruded product of sorghum supplemented with lysine by yeast extract showed higher nutritive value than the extruded sorghum. BV

PULSES

1593

Ketsa (S) and Poopattarangk (S). **Growth, physico-chemical changes and harvest indices of small edible-podded peas (*Pisum sativum* L. var. *macrocarpon*).** *Tropical Agriculture* 68(3): 1991: 274-278

Cowpeas

1594

Akinyele (IO). **Effect of process method on the energy and protein content, antinutritional factors and *in vitro* protein digestibility of cowpea milk (*Vigna unguiculata*).** *Food Chemistry* 42(2): 1991: 129-134

Extracts (hot water, cold water and boiling for 10 min. before cold water extraction) for small white and big white cvs of cowpeas showed energy 25.0 - 31.0 kcal/100 g (1 cal = 4.2 J), protein 1.0 - 2.0 g; sugars 0.5 - 3.8 g; iron 0.9 - 1.5 mg; *in-vitro* digestibility coeff. 60.5 - 81.8%, trypsin inhibiting units/ml 4.5 - 6.1, and phytic acid 61.8 - 80.5 µg/100g. Milk yield was higher in small white cv, and beany taste more in cold water extract, slight in preboiled process and absent in hot water extraction. SD

Pinto beans

1595

Borejszo (Z) and Khan (K). **Reduction of flatulence-causing sugars by high temperature extrusion of pinto bean high starch fractions.** *Journal of Food Science* 57(3): 1992: 771-772, 777

Flatulence causing sugars and sucrose of pinto bean were reduced by high temp. extrusion. Raffinose and stachyose content in HSF1 (high starch fraction) extruded at 163 C and HSF2 at 157 C were about 40 and 53% respectively of those found in whole dehulled beans. The high temp.-short time extrusion process may be used to produce bean fractions lowered in flatulence-causing sugars which might have advantages for new product development. SRA

OILSEEDS AND NUTS

1596

Eierdanz (H) and Hirsinger (F). **New materials for oleochemical reactions.** *FAT Science Technology* 92(12): 1990: 463-467 (De)

Presently oleochemistry has access to new raw materials obtained either through modifications of

existing oil crops or through selection of new crops. In this way higher yields of the fatty acid as well as fatty acids with uncommon structures were often obtained, such as the oils from new sunflower varieties with about 85% of oleic acid, or from new oil crops synthesizing functional groups in their fat molecules ready for chemical modifications, such as Coriandrum, Calendula or Limnanthes. With such new raw materials new and improved products can be derived for oleochemical applications through epoxidation, ozonolysis and sulfonization. AS

1597

Meshehdani (T), Pokorny (J), Davidek (J) and Panek (J). **Interactions of oxidized lipids with protein. Part 17. Effect of protein on the decomposition of products of the lipoxygenase-catalyzed oxidation in oilseeds.** *Die Nahrung* 34(10): 1990: 915-925

Almonds

1598

Bargman (TJ), Rupnow (JH) and Taylor (SL). **IgE-binding proteins in almonds (*Prunus amygdalus*): Identification by immunoblotting with sera from almond-allergic adults.** *Journal of Food Science* 57(3): 1992: 717-720

The allergenicity of three raw almond var. (Nonpareil, Mission and Carmel) and three types of processed almonds (blanched, blanched-roasted and almond butter) were examined and compared by immunoblotting using sera eight almond-allergic individuals. Serum from the 8 individuals exhibited unique IgE-binding patterns with most of the binding activity occurring with proteins of mol. wt. between 30,000 and 70,000 daltons. Two major allergens were identified with mol. wt. of ca 70,000 and 45,000 - 50,000 daltons, with each of these proteins binding to sera from 4 of the 8 allergic individuals. The immunoreactivity of the larger one was reduced by heat processing, while the smaller one was not affected. AS

Groundnuts

1599

Rustom (IYS), Lopez-Leiva (MH) and Nair (BM). **A study of factors affecting extraction of peanut (*Arachis hypogaea* L.) solids with water.** *Food Chemistry* 42(2): 1991: 153-165

The results by fractional factorial experiments showed that temp., pH, solids-to-water ratio, hydrolysis and soaking were significant for protein extraction; temp., speed of agitation, hydrolysis and soaking for fat extraction and only hydrolysis and soaking for carbohydrate extraction. Hydrolysis being depended on temp. and time, increased protein recovery; pH and solids-to-water ratio increased protein recovery; agitation speed increased carbohydrate and decreased protein and fat content of extracts. SD

Rapeseed

1600

schwenke (KD), Kim (YH), Kroll (J), Lange (E) and Mieth (G). **Modification of the low-molecular weight basic albumin fraction from rapeseed (*Brassica napus* L.) by acetylation. Part 2. Selected functional properties.** *Die Nahrung* 35(3): 1991: 293-301

The influence of acylation on surface functional properties, solubility and heat-induced aggregation of the low-mol. wt. basic protein fraction (napin) from rapeseed was studied. While the native protein was soluble over the whole pH-range, the exhaustively acetylated one became precipitable in the weakly acidic range. acetylation of 70 - 80% of the protein amino groups caused a stabilizing against heat-induced aggregation. The native protein had a high foam capacity and stability which were only slightly changed after acylation. Decreasing volume specific work in the order native > acetylated > succinylated protein pointed, however, to an improved foamability of acylated napin. Succinylation increased the interfacial tension on the oil/water interface, while acetylation gave both an increasing and decreasing effect depending on the degree of modification. The emulsifying capacity decreased after acylation in the order native > acetylated > succinylated. AS

Rapeseed proteins

1601

Kroll (J) and Przybilski (H). **Toxicological evaluation of rapeseed protein products by means of a thyroidea stimulating test.** *FAT Science Technology* 93(6): 1991: 228-231

On the basis of a Thyroidea Stimulating Test (TST-Test) with rats 3 rapeseed protein products from *Brassica napus*, Var. Sollux (industrial rapeseed meal = REM; rapeseed protein isolate = RPI prepared from REM by extraction, ultra- and diafiltration; rapeseed extraction residue = RER, results after the protein extraction of REM) were tested with regard to their thyreotoxical efficacy. As expected the REM shows a strong thyreotoxic effect. In contrast to that and in comparison to a control diet the RER caused no negative effects on the thyroidea functions. The RPI-diet leads possibly to

a slight impairment of metabolism of the thyroidea hormones. AS

Sesame

1602

Nagaraj (G). **Fatty acid profile of new plant types in sesame (*Sesamum indicum* L.).** *Journal of the Oil Technologists Association of India* 23(2): 1991: 28-29

Fourteen var. of sesame including those just released and others at the advanced stages of breeding lines were analysed for oil content, refractive index, iodine value and fatty acid composition. Oil content of the var. ranged from 41.4 to 54.6%; among the released var. Rajeswari contained 54.6% oil and among the advanced breeding lines X64 contained 55% oil. Iodine value was > 106 in all var. The main fatty acids of sesame were 18:1 (45.3 - 41.9%), and 18:2 (41.7 - 37.6%). SRA

Soybeans

1603

Petres (J), Senkalszky-Akos (E) and Czukor (B). **Inactivation of trypsin inhibitor, lectin and urease in soybean by hydrothermal treatment.** *Die Nahrung* 34(10): 1990: 905-913

Soy products

Soy sauces

1604

Tien (CJ) and Chiang (BH). **Filtration of soy sauce by ceramic membrane.** *Journal of Food Science* 57(3): 1992: 740-742

Clarified soy sauce could be manufactured by heating the raw sauce, followed by filtration through 0.2 μm pore size ceramic membrane. The filtered product was free of bacteria. The soluble components of the soy sauce passed through the membrane freely, thus the composition of the sauce was not altered, but significantly reduced turbidity. The simplicity of ceramic membrane processing and the high quality of the membrane-filtered product make it good prospect for replacing the conventional filtration method. SRA

1605

Lee (YS) and Homma (S). **Comparison of chelating activity of soy sauce and fish sauce produced in Asian countries.** *Journal of Japanese Society for Food Science and Technology (Nippon Shokuhin Kogyo Gakkaishi)* 38(6): 1991: 515-519

Sixteen soy sauce and 4 fish sauces produced in Asian countries were subjected to electrodialysis. Their nondialyzable fraction was determined for Fe (II) chelating activity by HPLC using a gel permeation column equilibrated with 0.01 M acetate buffer (pH 4) containing 0.1 mM Fe (II) sulphate. The Fe-complex of each sample was detected in melanoidin fractions and in uncoloured fractions, and the characteristics of the sauce sample were represented by the elution profiles of Fe-complex. The results show that the amount of iron chelated per ml of electrodialyzed soy sauce ranged from 0.11 to 1.95 mg, and that of the fish sauce ranged from 0.13 to 0.50 mg. The chelating activity of soy sauce was larger than that of fish sauce. The chelating activity of the sauces was not always correlated with the colour intensity at 450 nm of the samples, since some Fe complex appeared in uncoloured fractions of HPLC analysis. AS

1606

Lee (YS) and Homma (S). **Desalting by electrodialysis to measure iron chelating activity of melanoidin in soy sauce and fish sauce.** *Journal of Japanese Society for Food Science and Technology (Nippon Shokuhin Kogyo Gakkaishi)* 38(6): 1991: 556-562

Tempe

1607

Hering (L), Bisping (B) and Rehm (HJ). **Patterns and formation of fatty acids at tempe fermentation by several strains of *Rhizopus* sp.** *FAT Science Technology* 93(8): 1991: 303-308

Several fungi and bacteria have been isolated and determined from Indonesian tempe and soaking water. It could be shown that strains of *Rhizopus* sp. metabolize the soybean lipids and change the fatty acid composition only little. In principle the fatty acid composition of tempe represents a composition close to that of soybeans with an increased content of oleic acid. During a fermentation the degree of unsaturation decreased due to decreasing linoleic acid and α-linolenic acid and increasing oleic acid. The intracellular fatty acid composition of the fungi differed widely in dependence on the culture conditions used. If the fungi were forced to produce their lipids de novo, and inversion of linolenic acid position isomers appeared, γ-linolenic acid reached values up to 21%. In comparison with mycelium grown on soybeans there was a loss of linoleic acid for the benefit of all the other fatty acids, especially oleic acid. A

significant loss of total lipids during a fermentation could not be found. AS

Soy proteins

1608

Wang (CR) and Zayas (JF). **Emulsifying capacity and emulsion stability of soy proteins compared with corn germ protein flour.** *Journal of Food Science* 57(3): 1992: 726-731

Response surface methodology studies showed that both emulsifying capacity (EC) and emulsion stability (ES) increased with increasing concn. from 0.4 to 0.8% of soy flour (SF), soy concentrate (SC), soy isolate (SI) and corn germ protein flour (CGPF). In all samples, EC and ES increased as pH increased from 6 to 8. Increasing incubation temp. of protein solutions from 20 to 70 C or from 4 to 20 C did not affect EC or ES, respectively. SF had the highest EC, followed by SI, SC and CGPF. SRA

TUBERS AND VEGETABLES

Onions

1609

Mencarelli (F), De Santis (D), Massantini (R) and Contini (M). **Low O_2 concentrations use for the short term onion slices storage.** *Industrie Alimentari* 29(287): 1990: 982-984 (It)

Low O_2 concn. (1 and 2%) inhibit respiration and ethylene production in onion slices stored for 6 days at 5 C in humidified continuous flow system. Weight loss is lower in these samples than in slices kept at higher concn. (4, 6, 8 and 21%) because of the different respiration rates. No difference was noted in soluble solids content but dry matter in slices was lower than in whole bulb. In contrast, higher content in pyruvic acid as indicator of pungency was evalauted in samples kept in 1 and 2% O_2. AS

Beet

1610

Hassanien (F), El-Makjzangy (A) and Avyad (K). **Application of polysaccharide enzymes in beet pulp.** *Die Nahrung* 34(5): 1990: 469-473

The application of commercial cellulolytic and pectolytic enzyme of fungal origin to hydrolysis of beet pulp is proposed in this study. The possibility of operating the hydrolysis process on a continuous basis is outlined. BV

Potatoes

1611

Abdel-Kader (ZM). **Studies on some water-soluble vitamins retention in potatoes and cow peas as affected by thermal processing and storage.** *Die Nahrung* 34(10): 1990: 899-904

Washing had no significant effect on the levels of vitamins in both potatoes and cow peas. Blanching at 100 C for 2 min. or thermal processing at 121 C for 20 min. had a great effect on the retention of ascorbic acid and thiamine and riboflavin. The retention of ascorbic acid and thiamine had been affected by the storage conditions at 25 C for 6 months; there was no significant change of riboflavin content in potatoes and cow peas. Laboratory study showed leaching was largely responsible for vitamin losses during water blanching, thermal processing and storage. BV

Sweet potatoes

1612

Shi (Z), Bassa (IA), Gabriel (SL) and Francis (FJ). **Anthocyanin pigments of sweet potatoes - *Ipomoea batatas*.** *Journal of Food Science* 57(3): 1992: 755-757, 770

The anthocyanin pigments of red sweet potato roots (Ipomoea batatas) were isolated, purified and identified by HPLC and conventional paper chromatographic, spectral and chemical methods. Two major pigments and two minor pigments were present in fresh tissue slices extracted with boiling 1% HAc methanol. Tissues extracted cold yielded 11 or more pigments probably from degradation of the two major pigments. One major pigment was identified as peonidin-3-diglucoside-5-glucoside with 3 molecules of ferulic acid and one molecule of caffeic acid. The other major pigment was peonidin-3-diglucoside-5-glucoside with 2 molecules of ferulic acid and one caffeic acid. AS

1613

Abdel-Kader (ZM). **Effect of boiling and baking on the content of some nutrients of sweet potatoes.** *Die Nahrung* 35(3): 1991: 321-324

The changes of proteins, minerals, sugars, starch, ascorbic acid and carotenoids during boiling and baking of sweet potatoes is studied. BV

Vegetables

1614

Ueda (S), Kuwabara (Y), Hirai (N), Sasaki (H) and Sugahara (T). **Antimutagenic capacities of different kinds of vegetables and mushrooms.** *Journal of Japanese Society for Food Science and Technology (Nippon Shokuhin Kogyo Gakkaishi)* 38(6): 1991: 507-514

Extracts of lemonbalm, thyme, butterbur flower, momijigasa, oregano, field horsetail, shiroza, gyojaninniku and tarragon were found to possess the strong capacities of inactivating the mutagenicity of Trp-P-1. 45% of mushroom samples possessed relatively weak antimutagenic activity compared to vegetables. BV

Asparagus

1615

Dall'Aglio (G), Carpi (G), Rosa (MD) and Palmieri (L). **Dehydration of *Asparagus* tips and butts.** *Industria Conserve* 66(2): 1991: 125-129 (it)

Asparagus butts dehydrated by air gave satisfactory results and was suitable as a ingredient for instant soups. Combined air-drying/freeze-drying of asparagus tips gave good flavour and reconstitution properties and were less brittle than their freeze-dried only counterpart. BV

Tomatoes

1616

Stoforos (NG) and Reid (DS). **Factors influencing serum separation of tomato ketchup.** *Journal of Food Science* 57(3): 1992: 707-713

The effect of tomato cv (VF 145B-7879, VC 204, Ferry Morse E 0204 and Peto 98) breaking procedure, starting tomato paste concn., reconstituted paste, homogenization treatment, percent total and water insoluble solids and pH on serum separation of tomato ketchup was investigated. The cv. Peto 98 exhibited least serum separation and cv VF 145B-7879 exhibited the most. The two intermediate cvs. VC 204 and Ferry Morse E 0204 did not differ significantly. Medium break processing at 107.2 C after a 10 min hold at room temp. gave final product with least serum separation followed by hot break, cold break and modified hot break respectively. SRA

1617

Vicini (E) and Previdi (MP). **Gas-forming ability of osmofermentative lactic acid bacteria in tomato products.** *Industria Conserve* 66(1): 1991: 20-25 (It)

Twenty-eight osmofermentative lactobacilli and nine pediococci strains were inoculated into small jars of strained tomatoes and of tomato paste of 18, 28 and 36° Brix, vacuum sealed and incubated at 30 C for 14-28 days. 5.41%, 24.32% and 27.02% of the strains swelled the containers of strained tomatoes and tomato paste of 18 and 28° Brix, respectively. In other cases, either disappearance or remarkable reduction of vacuum was observed. In tomato paste of 36° Brix only 27% of strains were able to grow. At the same time pH changes caused by the bacteria were also assessed. Various tomato constitutents were tested in MRS broth in order to identify the substances available for gas-production: 91.67% of lactobacilli and 62.5% of pediococchi formed gas from citric acid and glutamic acid, respectively. AS

FRUITS

1618

Sanchez (AH), Castro (AD) and Rejano (L). **Controlled fermentation of caperberries.** *Journal of Food Science* 57(3): 1992: 675-678

1619

Owen (SR), Tung (MA) and Durance (TD). **Cutting resistance of a restructured fruit bar as influenced by water activity.** *Journal of Texture Studies* 22(2): 1991: 191-199

The cutting force increased 100 fold as the product was dried from initial cutting resistance of 4.4 N at 0.86 a_w to a max of 452 N at 0.33 a_w below which the samples were brittle with lower cutting resistance as affected by the level of apple puree and maltodextrin. SD

1620

Bhajekar (DV) and Kulkarni (PR). **Osmotolerant yeast isolates from fruit preserves.** *Die Nahrung* 35(1): 1991: 99-101

The spoilage yeasts isolated and characterised are: *Schizosaccharomyces pombe* from Amla (*Embilca officinalis*), syrup *Zygosaccharomyces bailii* from shredded mango sweet chutney (mango chunda), *Zygosaccharomyces fermentati* from pineapple murrabba (preserve) and Citeromyces matritensis from candied pieces of bottle gourd in syrup (petha). BV

Apples

1621

Fernandes (LI) and McLellan (MR). **Packaging effects on applesauce in multilayer polymeric films and glass.** *Journal of Food Science* 57(3): 1992: 671-674

Four different multilayer polymeric films were assessed for suitability as packaging materials for hot-filled fruit products, by determining the effect of storage time and temp. on applesauce packaged in each film type, as compared to glass. Applesauce from each package type was assessed at 5 wk intervals for changes in sensory and analytical characteristics during 15 wks storage at 20, 30, 37 and 43 C. Films containing an ethylene vinyl alcohol or PVC layer performed similarly to glass. Applesauce packaged in a nylon/linear LDPE film was less acceptable and had significantly greater browning at all temp. AS

1622

Ngadi (MO) and Correia (LR). **Solid state ethanol fermentation of apple pomace as affected by moisture and bioreactor mixing speed.** *Journal of Food Science* 57(3): 1992: 667-670

1623

Lal (BB), Maini (SB) and Thakur (GS). **Pack apples in corrugated-fibreboard cartons.** *Indian Horticulture* 36(4): 1992: 12

Different packagings such as conventional wooden box, veneer box, pine-needle box, corrugated fibre-board box and new wooden box, used for packing apples is described. Telescopic corrugated-fibre board cartons with apple trays having a dimension of 508 x 308 x 280 cm, with 125 fruits capacity is recommended for cold storage of apples. SRA

Apricots

1624

Senesi (E), Forni (E), Torreggiani (D), Crovetti (R) and Bertolo (G). **Influence of pasteurization on the quality of osmodehydrated apricots packed in glass jars and flexible pouches. Part 1. Changes in chemical characteristics, colour and taste.** *Industria Conserve* 66(1): 1991: 9-13 (It)

The influence of packing (glass jars and flexible pouches) and heat treatment on some quality parameters of osmodehydrated apricot preserves was studied. Chemical (dry matter, pH, acidity, sugars), physical (colour) and sensory (colour, taste) characteristics were evaluated in the osmodehydrated fruits as well as in the final pasteurized product during 12 months' storage at room temp. Results showed that the process was well suited to yield high-quality apricot preserves. The samples packed both in glass jars and in flexible pouches remained acceptable throughout storage. Differences in some quality parameters (instrumentally measured colour and sensory characteristics) were found only at the end of the storage period, the samples in flexible pouches being slightly preferred to those in glass. AS

1625

Forni (E), Torreggiani (D), Crovetti (R), Senesi (E) and Polesello (A). **Influence of pasteurization on the quality of osmodehydrated apricots packed in glass jars and flexible pouches. Part 2. Texture changes as affected by pectic composition.** *Industria Conserve* 66(1): 1991: 14-19 (It)

Changes in pectic substances and firmness of apricots as affected by osmotic dehydration, pasteurization and packing in glass jars and flexible pouches were studied. Water-soluble pectin, oxalate-soluble pectin and residual protopectin were determined and correlated with instrumentally and sensorily measured fruit firmness. The analyses were carried out on fresh and processed apricots, as well as during storage of the latter for 12 months at room temp. Results showed a conversion of protopectin to water-soluble pectin during osmotic dehydration and, to a greater extent, during pasteurization and after 8 months of storage. However, the resulting loss of firmness remained within the limits of an acceptable product for up to 10 months, owing to the high protopectin index of the fresh fruit. The influence of protopectin on the fruit texture is evidenced by the good correlation between protopectin content and firmness measurements. Since no difference was found in the behaviour of the two packaging materials, flexible pouches can advantageously substitute glass jars. The study also showed the possibility of obtaining high-quality osmodehydrated products when fresh apricots with a high protopectin index are used. AS

Cherries

1626

Taillan (E), Ambid (C), Pech (JC) and Raynal (J). **Demethylation of pectic substances: Relationship to methylesterase activity during brine storage of cherries.** *Journal of Food Science* 57(3): 1992: 682-685

Dates

1627

Elsakr (AS). **Evaluation of date kernel oils and their effects on wheat flour characteristics.** *Grasas y Aceites* 42(3): 1991: 216-219

Aprimi dry date kernel oils have high levels of both caproic acid and stearic acid of 23.04 and 18.40% respectively, while Agwa date kernel oils have high levels of caprylic acid and capric acid of 22.31 and 12.20%. The addition of soft and dry date kernel oils did not improve the wheat flour strength but raised its resistance to extensibility. BV

Grapes

1628

Lamikanra (O), Kirby (SD) and Musingo (MN). **Muscadine grape polyphenoloxidase: Partial purification by high pressure liquid chromatography and some properties.** *Journal of Food Science* 57(3): 1992: 686-689, 695

Guavas

1629

Yen (G-C), Lin (H-T) and Yang (P). **Changes in volatile flavour components of guava puree during processing and frozen storage.** *Journal of Food Science* 57(3): 1992: 679-681, 685

Pasteurized (85 - 88 C, 24 sec) and stored (at 0 C, -10 C and -20 C for 4 months) guava (*Psidium guajava* L.) puree showed increase in aldehydes and hydrocarbons with decrease in esters when compared to unpasteurised puree. During 4 months storage at -20 C, alcohols and hydrocarbons decreased and ethyl alcohol, n-hexanal, decanoic acid, dodecanoic acid, ethyl acetate increased at 0 C and -10 C for 2 and 4 months respectively in stored pasteurized puree. SRA

Mangoes

1630

Marin (MA) and Cano (MP). **Patterns of peroxidase in ripening mango (*Mangifera indica*, L.) fruits.** *Journal of Food Science* 57(3): 1992: 690-692, 734

Chemical and biochemical changes were studied in Lippens and Smith mango cvs stored at 12 C and 85 - 90% rh. The chemical changes were similar in both varieties. During ripening pH values increased and acidity decreased, following the characteristics trend of climatic fruits. Firmness of Lippens and Smith fruit declines from 7.06 N/g to 1.70 N/g, and 7.32 N/g to 3.76 N/g respectively. The greenness of pulp diminished. Preclimateric fruit showed L (lightness) values around 80 and greenness values around -10. Postclimateric fruit showed values around 60 and -3 respectively. Preclimateric mangoes showed higher extractable protein content (0.5 mg/100 g f.w.) than ripe fruits (0.4 mg/100 f.w.). There was progressive increase in peroxidase activity at the first stage of fruit ripening (12 days cv Lippens; 10 days cv. Smith), then the activity remained constant. SRA

Muskmelons

1631

Forney (CF). **Ripening and solar exposure alter polar lipid fatty acid composition of 'honey dew' muskmelons.** *Hortscience* 25(10): 1990: 1262-1264

Polar lipids were extracted from immature through overripe 'Honey Dew' muskmelons (*Cucumis melo* L.) that were exposed to high or low levels of solar radiation. Fatty acid composition of the polar lipids changed and the percentage of unsaturated fatty acids increased as fruit ripened. The % of monounsaturated fatty acids palmitoleic and oleic acid as a percent of total fatty acids increased from 8% in melons of min maturity to > 50% in overripe melons. Also, the ratio of unsaturated to saturated fatty acids increased from 2.2 to 5.0. Total polar lipid fatty acid composition from middle mesocarp tissue (flesh) did not change as much during ripening as the polar lipid composition from the epidermis (peel). Peel tissue from the top of melons relative to the ground had unsaturation ratios of C18 fatty acids and C16 fatty acids 33% and 62% greater, respectively, than peel from the bottom of the melon. Melons of min maturity exposed to solar radiation had significantly more unsaturated C18 fatty acids than shaded melons. Increase in the percentage of unsaturated polar lipid fatty acids in 'Honey Dew' melons may relate to increases in chilling tolerance reported to occur with ripening and solar exposure. AS

Persimmons

1632

Lyon (BG), Senter (SD) and Payne (JA). **Quality characteristics of oriental persimmons (*Diospyros kaki* L. cv. Fuyu) grown in the Southeastern United States.** *Journal of Food Science* 57(3): 1992: 693-695

Strawberries

1633
Shamaila (M), Baumann (TE), Eaton (GW), Powrie (WD) and Skura (BJ). **Quality attributes of strawberry cultivars grown in British Columbia.** *Journal of Food Science* 57(3): 1992: 696-699, 720

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

1634
Klagge (VP) and Sen Gupta (AK). **Cocoa butter and the equivalents for chocolate-products.** *FAT Science Technology* 92(12): 1990: 485-492 (De)

Fatty acid and triglyceride composition of cocoa butter of various origins were analysed by GC. Significant differences were found depending on origin. Correspondingly the solid fat contents were also different. The rates of crystallization as determined by *gensen* cooling curve were also different, the softer samples crystallizing slower. In order to compensate the differences in quality of the natural cocoa butter of different origins, the CBEs (Cocoa Butter Equivalents) can be successfully incorportated in the compositions. The CBEs are produced by blending special vegetable fats of tropical origin and they not only resemble cocoa butter in its physical properties, but also in its chemical structure. These fats are allowed to be used for chocolate manufacture in England, Ireland and Denmark, but not in other EEC countries. But with the introduction of the EEC internal market, it is expected that the CBE fats will be allowed for chocolate manufacture in all EEC countries. The properties of the CBEs and their components are discussed. AS

1635
Chevalley (J). **An adaptation of the Casson equation for the rheology of chocolate.** *Journal of Texture Studies* 22(2): 1991: 219-229

The plastic viscosities and yield values for different shear rates calculated for values of Casson equation exponent in between 0.5 - 1 showed that m = 0.6 as the best choice for the approximate evaluation of the "true" yield. The characterization of the rheological behaviour of chocolate by yield value and plastic viscosity is practical. SD

Cocoa butter

1636
Ziegleder (G). **DSC-thermal analysis and kinetics of cocoa butter crystallization.** *FAT Science Technology* 92(12): 1990: 481-485

A DSC method for isothermal crystallization of cocoa butter is described. Valuable results can be obtained from this method about the specific crystallization tendency of cocoa butters of different origins and about temp. influence on crystallization times. The method is useful for quality control of cocoa butters and for process control during the tempering step of the industrial chocolate production. BV

Honeys

1637
Sabatier (S), Amiot (MJ), Tacchini (M) and Aubert (S). **Identification of flavonoids in sunflower honey.** *Journal of Food Science* 57(3): 1992: 773-774, 777

The flavonoids of sunflower honey were isolated and analyzed by different methods: RP-TLC, RP-HPLC/UV-Vis (diode array detection) using post-column derivatization, GC/MS. Five main compounds were identified as pinocembrin (5,7-dihydroxyflavone), pinobanksin (3,5,7-trihydroxyflavanone), chrysin (5,7-dihydroxyflavone), galangin (3,5,7-trihydroxyflavone) and quercetin (3,5,7,3',4'-pentahydroxyflavone). Two minor flavonoids were also detected: tectochrysin (5-hydroxy-7-methoxyflavone) and kaempferol (3,5,7,4'-tetrahydroxyflavone). All these compounds had been previously reported in propolis, another hive product. Honey is a source of flavonoids in the human diet. Flavonoid structures may provide an index of floral origin with further study. AS

Starches

1638
Miller (LA), Gordon (J) and Davis (EA). **Dielectric and thermal transition properties of chemically modified starches during heating.** *Cereal Chemistry* 68(5): 1991: 441-448

The dielectric properties and swelling characteristics of chemically modified starches with differing degrees of substitution and at different starch-to-water ratios were evaluated before and during heating. Thermal transitions and swelling properties of the starch granules were evaluated by differential scanning calorimetry (DSC) and microscopy, respectively. Dielectric constants (K') of

all starches remained constant during heating, and the loss factors (K") and absorptivities (1/RI) of most starches decreased slightly during heating except during starch thermal transition times as measured by DSC. AS

1639

Czuchajowska (Z), Sievert (D) and Pomeranz (Y). **Enzyme-resistant starch. IV. Effects of complexing lipids.** *Cereal Chemistry* 68(5): 1991: 537-542

Amylomaize VII starch, autoclaved at 125 C, was reacted during cooling below 100 C with lysophosphatidyl choline (LPC), sodium stearoyl lactylate (SSL), and hydroxylated lecithin (OHL). Differential scanning calorimetry (DSC) peaks at around 95-110 C indicated formation of amylose-lipid complexes and at around 155 C indicated the presence of enzyme-resistant starch (RS). Yields of RS from complexed samples isolated by thermostable bacterial α-amylase or amyloglucosidase were lower than yields of RS from the autoclaved and cooled control. Formation of complexes competes with amylose chains involved in generation of RS. Amylose-lipid complexes are enzyme-degradable, and an increase in complexed amylose reduced yields of RS. Amylose recrystallization in RS formation is competitively affected by complexation of amylose with LPC and SSL. Results of X-ray diffraction powder crystallography were in agreement with DSC measurements. Complexes of amylose with LPC, SSL, and OHL gave rise to V-type patterns; enzymatic hydrolysis of the complexes yielded B-type RS structures. AS

1640

Saura Calixto (F) and Abia (R). **Resistant starch: An indigestible fraction of foods.** *Grasas y Aceites* 42(3): 1991: 239-242

Aspects covered in this article are: resistant starch: concept resistant starch and nutrition: formation and analysis. BV

Sugars

1641

Guu (YK) and Zall (RR). **Nanofiltration concentration effect on the efficacy of lactose crystallization.** *Journal of Food Science* 57(3): 1992: 735-739

Increases in nanofiltration concn. factor resulted in decrease of the molar ratios of the select minerals, especially K and Na to lactose. As a result, relative gross yield of lactose crystals was increased about 10% when the ultrafiltration (UF) permeate of sweet whey was treated by nanofiltration at concn. factor = 3.0. The efficiency of lactose crystallization was increased about 8% when the UF permeate of skim milk was treated under the same condition. The relative gross yield of lactose crystals was affected by the minerals present in sweet whey and skim milk, mainly by K and Na. Thus depletion of these monovalent ions by nanofiltration membrane increased the efficiency of lactose crystallization. SRA

1642

Roos (Y) and Karel (M). **Crystallization of amorphous lactose.** *Journal of Food Science* 57(3): 1992: 775-777

This study investigates the rate of crystallization of amorphous lactose at varying T-T_g (temp. of glass transition) values using differential scanning calorimetry. At constant water content crystallization increased water in the remaining amorphous matrix which decreased its T_g and accelerated crystallization. At constant rh crystallization proceeded at a rate determined by T-T_g which increased with crystallinity. Temp. dependence of time to complete crystallization was confirmed to follow Williams-Landel-Ferry equation. The results can be used to evaluate diffusion and crystallization kinetics of amorphous carbohydrates. SRA

1643

Kumar (S), Sinha (RN) and Rai (B). **Influence of micronutrient spray and red-rot development, yield attributes and juice composition of sugarcane.** *Science and Culture* 57(3/4): 1991: 83-86

Red-rot disease adversely affects sugarcane juice. Quality degrading chlorophyll content causing imbalance of mineral nutrients status. Zinc sulphate, manganese sulphate, agromin and chilamin spray improves cane growth, juice quality and chlorophyll contents in leaf laminae. SD

BAKERY PRODUCTS

Cookies

1644

Kuragano (T), Kimura (H) and Wada (Y). **Physical properties of cookies made of synthetic flour composed of soft or hard wheat proteins and starch.** *Journal of Japanese Society for Food Science and Technology (Nippon Shokuhin Kogyo Gakkaishi)* 38(6): 1991: 476-483 (Ja)

Cookies prepared from the hard wheat flour were harder and less brittle. Cookies prepared from gliadin fraction of the soft wheat flour expanded well, while those prepared from the hard wheat flour showed low expansion ratio. A number of small peaks were observed on the surface of cookies prepared from the hard wheat flour. BV

Bread

1645

Martin (ML), Zeleznak (KJ) and Hoseney (RC). **A mechanism of bread firming. I. Role of starch swelling.** *Cereal Chemistry* 68(5): 1991: 498-503

Bread firming and starch recrystallization are not synonymous, although both occur during bread storage. Bread baked to 95 C in an electric resistance oven did not firm. Factors such as baking time and presence of shortening influenced the water-hydration capacity of the bread crumb. These factors also affected bread firmness during five days of storage. Increased baking time after the temp. reached 95 C in an electric resistance oven increased bread firmness on day 1. A proposed model maintains that bread firming results from cross-links (hydrogen bonds) between the continuous protein matrix and the discontinuous remanants of starch granules. AS

1646

Martin (ML) and Hoseney (RC). **A mechanism of bread firming. II. Role of starch hydrolysing enzymes.** *Cereal Chemistry* 68(5): 1991: 503-507

High levels (100 SKB units per loaf) of bacterial α-amylase stopped bread from firming during five days of storage. Supplementing bread with malted barley flour did not decrease the firming rate. Bread supplemented with either fungal or bacterial α-amylase contained large quantities of residual dextrins (degree of polymerization 3-9), whereas bread supplemented with malted barley flour contained only small quantities of those dextrins. β-Amylase was effective in reducing bread firmness; however, very high levels of supplementation did not completely stop the bread-firming process. Bread supplemented with pullulanase firmed at a faster rate than did the unsupplemented control bread. Dextrins of a particular size are presumably responsible for the antifirming effect. The suggested mechanism of bread firming maintains that cross-links between protein fibrils and starch granule remanants result in bread firming. Dextrins of a particular size interfere with these cross-links (hydrogen bonds) between starch and protein. AS

1647

He (H) and Hoseney (RC). **Gas retention in bread dough during baking.** *Cereal Chemistry* 68(5): 1991: 521-525

Gas retention in bread dough during baking was studied using pup loaves and an electric resistance oven. The amount of CO_2 released during the early stages of baking was small and constant. As the temp. was increased from 55 to 72 C, the rate of CO_2 release increased slightly. The major loss in gas-retaining ability of the bread dough appeared to start at 72 C. Doughs made from fractionated and reconstituted flours (gluten, starch and water-soluble fractions) containing a preheated fraction and two unheated fractions showed that when starch was preheated to above 70 C, the ability of the dough to retain gas was essentially lost. Similarly, doughs containing gluten or water solubles preheated to the same temp. retained gas. Therefore, the presence of gelatinized starch is apparently necessary for the change in gas retention of dough. A mechanism for changes in the gas-retaining ability of dough is proposed based on the dynamic rheological properties of dough during baking and the microscopic structure of baked bread. AS

1648

Damir (AA). **Effect of storage temperature and heat treatment on staling of balady bread.** *Getreide-Mehl und Brot* 44(4): 1990: 125-127 (De)

1649

El-S (N), Doma (M), Spicher (G) and Ahrens (E). **Microbiological and biochemical investigations for optimization of balady-bread. Part 2. Microbiology of the flours, Sultani-starters and yeasts for balady-bread production.** *Getreide-Mehl und Brot* 45(8): 1991: 240-247 (De)

1650

Seiffert (M) and Bormann (K). **Use of bread and rolls in cholesterol-lowering.** *Getreide-Mehl und Brot* 45(6): 1991: 181-184 (De)

Cakes

1651

Pong (L), Johnson (JM), Barbeau (WE) and Stewart (DL). **Evaluation of alternative fat and sweetener systems in cupcakes.** *Cereal Chemistry* 68(5): 1991: 552-555

A commercial fat substitute, N-Flate, and a sweetening system of 1.5% aspartame, 35.5% fructose, and 63% polydextrose (AFP) were evalauted for their potential as fat and sugar

substitutes, respectively. Four cupcake variations (shortening and sugar, shortening and AFP, N-Flate and sugar, and N-Flate and AFP) were prepared. The batter from the two variations prepared with N-Flate had a significantly higher pH and sp. gr. than the two variations prepared with shortening. A lower standing height, a firmer texture, a higher moisture content, and a darker crumb colour were observed in the two variations prepared with N-Flate. The batter from the two variations prepared with AFP also had a higher pH and sp. gr. than the two variations prepared with sugar. A lower standing height, a firmer texture, a higher moisture content, and a lighter crust colour were also observed in the two variations prepared with AFP. Interaction effects were significant for sp. gr., standing height, crust colour and tenderness. Sensory evaluation results showed that the two variations prepared with N-Flate were less tender and had less cell uniformity than those prepared with shortening. Variations prepared with AFP were less moist, had a more bitter crust and crumb, and showed greater cell uniformity than those prepared with sugar. No interaction effects were observed for any of the sensory attributes. To increase the standing height and improve the texture of cupcakes prepared with N-Flate or AFP, the relative proportions of the ingredients and the procedure may need to be altered to suit each variation. The use of flavouring agents and the elimination of aspartame from the sweetener system may help to mask or reduce the bitter aftertaste. Reduced-fat and reduced-calorie baked products offer an alternative for consumers who must restrict calorie intake. AS

Dough

1652

Skerritt (JH). **A simple antibody-based test for dough strength. I. Development of method and choice of antibodies.** *Cereal Chemistry* 68(5): 1991: 467-474

A monoclonal antibody-based enzyme-immunoassay method was developed to predict dough strength and mixing properties from the analysis of small samples of wheat flour or whole meal. The choice of antibody, grain protein extractant, and extraction technique were important. Solvents such as alkali or acid extracted. Quality-related differences in antibody binding to grain proteins extracted using sodium dodecyl sulphate (SDS) with a reducing agent (dithiothreitol, [DTT) were noted. Proteins could be extracted by vortex; ultrasonic or high frequency homogenisation, were inferior. Quality-related differences could be measured using grain extracted a single time, although the SDS-DTT extractant provided greater differentiation when a simple preextraction step was performed using SDS. The specificities of the antibody combinations were assessed using gluten protein fractions and genetic wheat stocks, including Chinese Spring aneuploids and near-isogenic wheats that lack certain high and low mol. wt. glutenin subunits and gliadins. The best quality differentiation was obtained using antibody combinations that bound to chromosome 1D-encoded high mol. wt. glutenin subunits. However, these antibodies bound to glutenin subunits both from var. having allelic subunits 1Dx5 and 1Dy10 and from var. having allelic subunits 1Dx2 and 1Dy12, although greater binding to proteins was seen from extracts of wheat flours that yielded stronger doughs. AS

1653

Skerritt (JH). **A simple antibody-based test for dough strength. II. Genotype and environmental effects.** *Cereal Chemistry* 68(5): 1991: 475-481

The ability of simple antibody-based tests to assess and predict specific aspects of dough quality was evaluated using flours from several sets of wheat lines and varieties. Highest correlations between the binding of glutenin-specific antibodies and dough parameters were observed with dough strength (maximal resistance) and dough mixing (development time and breakdown). Differentiation between stronger and weaker lines was greatest when the sodium dodecyl sulphate (SDS)-insoluble protein fraction was examined. Significant correlations between dough quality parameters and antibody binding were obtained with sets of varieties grown at different levels of nitrogen fertilization at the same site or in a range of environments. The test was equally useful for analyzing a diverse range of unrelated genotypes and for examining progeny from related crosses. Finally, in a set of wheats having similar high mol. wt. glutenin subunits, differences in antibody binding were obtained that were highly correlated with differences in dough properties. AS

1654

Meuser (F), Faber (Chr), Vollmar (A) and Spicher (G). **Investigations on the increase of acid production by microorganisms in a continuous working sour dough fermenter.** *Getreide-Mehl und Brot* 44(4): 1990: 121-125 (De)

MILK AND DAIRY PRODUCTS

1655

van Mil (PJJM) and Bouman (S). **Freeze concentration of dairy products.** *Netherlands Milk and Dairy Journal* 44(1): 1990: 21-31

Skim milk, homogenized whole milk and a liquid containing diacetyl were conc. in a single-stage pilot freeze concn. plant from about 10% to 36, 38 and 48% total solids respectively. No undesirable physical or chemical changes in the products was noticed. The sensory quality of the product was good and the aroma retention in the diacetyl-containing liquid was high (99.5%). The losses of milk components in the removed water remained low (100 p.p.m. or less). However, extreme care must be taken regarding the cleaning and disinfection of the equipment. BV

Milk

1656
Claassen (M) and Lawless (HT). **Comparison of descriptive terminology systems for sensory evaluation of fluid milk.** *Journal of Food Science* 57(3): 1992: 596-600, 621

1657
Chen (J-P) and Yang (B). **Enhancement of release of short-chain fatty acids from milk fat with immobilized microbial lipase.** *Journal of Food Science* 57(3): 1992: 781-782

Free fatty acid profiles of lipolyzed milk fat could be controlled by using gel-entrapped lipase. Enhancement of release of short-chain fatty acids is achievable with such immobilized enzyme systems due to the apparent difference in diffusion rates between milk fat triglycerides. SRA

1658
Jairam (BJ) and Nair (PG). **Impact of genetic variants of milk proteins on rennet curd strength and heat stability of milk.** *Indian Dairyman* 44(3): 1992: 125-128

Eleven hundred and thirteen mastitis free milk samples of individual cows of different breeds, were used for assessing the association of milk proteins and their genetic variants with the rennet firmness and heat stability of milk. β-casein produced tougher curd in Tharparkar and Red Sindhi breeds than in Brown Swiss x Sahiwal cross bred animals, but depressed the heat stability of milk in all breeds. α-lactalbumin elevated the stability of milk. None of the proteins were significantly different among the cross breds. β-casein AB generated 7.1 g tougher curd than S_1-casein BB 4.5 g tougher curd than k casein AB and β-lactoglobulin AB. SRA

1659
Hegazi (FZ). **Kinetics of the extracellular proteinase production by the proteolytic biovar of *Enterococcus faecalis* in complex media and skim milk.** *Die Nahrung* 35(1): 1991: 97-98

Milk products

Cheese

1660
Chandan (RC). **Cheese made by direct acidification.** *Indian Dairyman* 44(3): 1992: 133-141

Describes the directly acidified cheeses of the world which include paneer, channa and Queso Blanco or Latin American white cheese. The aspects covered about paneer are the manufacturing procedure, milk standardization, heat treatment, coagulation, draining whey, hooping, pressing and cooling, yield of paneer, changes during storage, and common defects in paneer. The manufacturing process for channa, and the factors affecting functional attributes of channa including the characteristics of coagulants and the pH and temp. of coagulation have been described. SRA

Cheddar cheese

1661
Farkye (NY) and Landkammer (CF). **Milk plasmin activity influence on Cheddar cheese quality during ripening.** *Journal of Food Science* 57(3): 1992: 622-624, 639

Up to six-fold increase in plasmin activity in milk did not significantly ($p < 0.05$) affect the composition (moisture, protein, NaCl) of cheese, although a slight increase in moisture and decrease in protein content of the cheese was noted. Proteolysis in cheese increased with plasmin activity, resulting in improved flavour and overall quality of the cheese after 3 and 6 months ripening. Consistently, increasing the plasmin activity in milk about three-fold resulted in cheese of superior sensory quality. AS

1662
Piggot (JR) and Mowat (RG). **Sensory aspects of maturation of Cheddar cheese by descriptive analysis.** *Journal of Sensory Studies* 6(1): 1991: 49-62

Cheddar cheese produced under controlled conditions was evaluated at different stages of maturation by quantitative descriptive method developed. The results clearly grouped cheese samples as vintage, mature and medium in comparison to reduced fat cheese. SD

Mozzarella cheese

1663

Jana (AH). **Browning of Mozzarella cheese - a review.** *Indian Dairyman* 44(3): 1992: 129-132

The aspects covered in the review are: significance of browning, manifestation of browning, causative factors; and measures to prevent or minimize browning. 20 references. SRA

Wheys

1664

Turgeon (SL), Gauthier (SF) and Paquin (P). **Emulsifying property of whey peptide fractions as a function of pH and ionic strength.** *Journal of Food Science* 57(3): 1992: 601-604, 634

Solubility and emulsifying properties of whey protein concentrate (WPC), heat-treated WPC (90 C, pH 2.5, 10 min), and their tryptic or chymotryptic peptide fractions obtained by ultrafiltration were measured from pH 3 to 9 at two ionic strengths (μ = 0 and 0.6). There was no correlation between solubility and emulsifying capacity (EC). Heat treatment induced some conformational changes in WPC, resulting in better EC. Some peptide fractions had better EC than proteins at pH 7 and 9. Treatments resulting in more hydrophobic peptides or a higher content of larger peptides produced fractions with better emulsifying properties. pH and ionic strength affected conformation and emulsifying properties of proteins and peptides. AS

1665

Beuschel (BC), Culbertson (JD), Partridge (JA) and Smith (DM). **Gelation and emulsification properties of partially insolubilized whey protein concentrates.** *Journal of Food Science* 57(3): 1992: 605-609, 634

Ultrafiltered retentate of whey was heat-processed to prepare whey protein concentrates (WPC) with protein solubilities ranging from 27.5% to 98.1% in 0.1M NaCl, pH 7.0. Proximate and protein compositions of each WPC were determined. Properties of 20% (w/w) protein WPC gels in 0.1M and 0.6M NaCl, pH 7.0, on heating to 60, 70, 80 and 90 C and emulsification properties of WPC (0.5% (w/w) protein) in 0.1M NaCl at pH 6.0, 7.0 and 8.0 were analyzed. Gel apparent stress and strain at failure decreased and expressible moisture increased as solubility decreased from 98.1% to 41.0% at all heating temp. Emulsification Activity Index was highest at pH 7.0, emulsions were most stable at pH 8.0. AS

1666

Gueguiner (C), Dumay (E), Salou-Cavalier (C) and Cheftel (JC). **Microcoagulation of a whey protein isolate by extrusion cooking at acid pH.** *Journal of Food Science* 57(3): 1992: 610-616

Whey protein isolate (WPI) extrusion-coagulated at pH 3.9 displayed a high nitrogen solubility index (NSI) (43 - 47%). Electrophoresis indicated that the β-lactoglobulin constituent was entirely soluble in 1% sodium dodecylsulphate (SDS), while scanning calorimetry revealed about 82% protein unfolding. WPI extrusion-coagulated at pH 4.5 - 6.8 displayed lower NSI (25%), were less soluble in 1% SDS, were 88% unfolded and had grainy texture. Light microscopy, centrifugation in glycerol solution, and laser diffractometry indicated the acid spread (pH 3.9) was composed of small coagulated particles, mean diameter 11.5 μm (vol. basis). SRA

1667

Steventon (AJ), Gladden (LF) and Fryer (PJ). **A percolation analysis of the concentration dependence of the gelation of whey protein concentrates.** *Journal of Texture Studies* 22(2): 1991: 201-218

The gelation of whey proteins, with the application of percolation theory, studied using oscillatory rheometry, and gel time results interpreted in terms of Monte Carlo simulation on a model lattice gave a satisfactory second order kinetic model. SD

Yoghurts

1668

Ariga (H), Urashima (T), Michihata (E), Ito (M), Morizono (N), Kimura (T), Takahashi (S). **Extracellular polysaccharide from encapsulated *Streptococcus salivarius* subsp. *thermophilus* OR 901 isolated from commercial yoghurt.** *Journal of Food Science* 57(3): 1992: 625-628

1669

Ramaswamy (HS) and Basak (S). **Rheology of stirred yoghurts.** *Journal of Texture Studies* 22(2): 1991: 231-241

Stirred yoghurt rheology, evaluated by Haake Rotovisco Model RV20, M-5-Osc measuring head and MV-1 rotor assembly, can be described by Herschel-Bulkley and linear models during successive upward and downward shearing sequence. Temperature dependence of rheological parameters follow Arrhenius and Turian models. By adopting the procedure desired consistency in

flavoured yoghurt based beverages can be fabricated. SD

Milk proteins

1670
Pappas (CP) and Rothwell (J). **The effects of heating, alone or in the presence of calcium or lactose, on calcium binding to milk proteins.** *Food Chemistry* 42(2): 1991: 183-201

The results showed that caseins of cow's milk when treated with Ca at 25 C for 30 min., pH 7.00 had high Ca binding capacity in the order α_{s1}-casein > β-casein > k-casein and for whey protein in the order β-lactoglobulin (β-lg) > α-lactalbumin (α-la). Presence of lactose at 25 C did not affect appreciably the Ca binding but heating of the whole casein at 80 or 95 C for 30 min. increased it. The Ca binding of α_{s1}-casein was not affected by heating in presence or absence of Ca as the accessibility and/or the number of Ca binding centres were not increased. β-casein when heated with Ca was affected in Ca binding but not β-lg. In the absence of Ca there were 21.5% increase at 80 C and 40% decrease at 95 C in Ca binding compared to unheated samples. SD

Caseins

1671
Medina (AL), Colas (B), Meste (ML), Renaudet (I) and Lorient (D). **Physicochemical and dynamic properties of caseins modified by chemical phosphorylation.** *Journal of Food Science* 57(3): 1992: 617-621

Chemical phosphorylation of bovine caseins may be useful for changing their physicochemical properties. Depending on the pH of phosphorylation of caseins by phosphorus oxychloride ($POCl_3$), covalent bonds between phosphate groups and different specific amino acids were formed. After casein phosphorylation, intermolecular associations may occur, as shown by electrophoresis. The solubility of modified casein was increased near the isoelectric point (pHi) and decreased at alkaline and acidic pH. In the presence of Ca^{++} at alkaline pH, the solubility of phosphorylated casein was lower than that of the control. Rheological parameters appeared to be efficient indices of structural changes occurring in proteins as a result of chemical modifications. Electron spin resonance studies showed that the flexibility of phosphorylated casein was higher than that of the control. AS

MEAT AND POULTRY

1672
Stiles (ME) and Hastings (JW). **Bacteriocin production by lactic acid bacteria: Potential for use in meat preservation.** *Trends in Food Science and Technology* 2(10): 1991: 247-251

This review summarizes the information on the bacteriocins and bacteriocinogenic lactic acid bacteria (*Lactococcus* spp., *Lactobacillus* spp. *Carnobacterium* spp., *Leuconostoc* spp. and *Pediococcus* spp.) from meat that could play an important role in meat preservation. 55 references. BV

Meat

1673
Alur (MD), Chawla (SP) and Nair (PM). **Microbiological method to identify irradiated meat.** *Journal of Food Science* 57(3): 1992: 593-595

Beef

1674
Berry (BW). **Low fat level effects on sensory, shear, cooking and chemical properties of ground beef patties.** *Journal of Food Science* 57(3): 1992: 537-540, 574

1675
Gariepy (C), Amiot (J), Pommier (SA), Flipot (PM) and Girard (V). **Electrical stimulation and 48 hours aging of bull and steer carcasses.** *Journal of Food Science* 57(3): 1992: 541-544

1676
Kenney (C), Kastner (CL) and Kropf (DH). **Muscle washing and raw material source affect quality and physicochemical properties of low-salt, low-fat, restructured beef.** *Journal of Food Science* 57(3): 1992: 545-550

1677
Kenney (PB), Kastner (CL) and Kropf (DH). **Raw and preheated epimysium and gelation affect properties of low-salt, low-fat, restructured beef.** *Journal of Food Science* 57(3): 1992: 551-554

1678
Townsend (WE) and Davis (CE). **Transaminase (AST/GOT and ALT/GPT) activity in ground beef as a means of determining end-point temperature.** *Journal of Food Science* 57(3): 1992: 555-557

1679

Jackson (TC), Acuff (GR), Sharp (TR) and Savell (JW). **Contribution of *Lactobacillus plantarum* and *Leuconostoc mesenteroides* subsp. *mesenteroides* to atypical odours of beef strip loins.** *Journal of Food Science* 57(3): 1992: 785-786, 791

Pork

1680

Brewer (MS), Ikins (WG) and Harberrs (CAZ). **TBA values, sensory characteristics, and volatiles in ground pork during long-term frozen storage: Effects of packaging.** *Journal of Food Science* 57(3): 1992: 558-563, 580

1681

Jackson (TC), Acuff (GR), Sharp (TR) and Savell (JW). **Volatile compounds on sterile pork loin tissue inoculated with *Lactobacillus plantarum* and *Lactobacillus fermentum*.** *Journal of Food Science* 57(3): 1992: 783-784

Products

1682

Campanini (M), Manganelli (E) and Barbuti (S). **Antimicrobial activity of lactobacilli from meat product against *Listeria monocytogenes*.** *Industria Conserve* 66(2): 1991: 117-121 (It)

Thirty-eight strains of lactic acid bacteria from salami were screened for antagonistic effect against *L. monocytogenes* strains isolated from meat products. An agar-plate diffusion method in different media and an impedometric detection method using the pH-adjusted and filtered supernatant of the broth cultures of lactic acid bacteria were used. The latter method showed three strains of *Lactobacillus* spp to be very active against the *L. monocytogenes* strains tested. In particular, a strain, after growth in APT at 30 C for 24 h, adjustment of the pH of the culture to 6.5 and filtration (0.2 μ), inhibited *L. monocytogenes* growth for a long time (delays in detection time > 20 h), at pH 5.5 no growth was observed in 96 h (flat impedometric curve). The anti-Listeria effect of this strain was verified by plate counts of *Listeria* cells surviving during incubation at 30 C. At pH 5.5 not only was growth inhibition confirmed, but a bactericidal effect (about 3.7 decimal reductions in 120 h) was also observed. AS

Ham

1683

Lawlis (TL), Plimpton (RF), Ockerman (HW) and Parrett (NA). **Electrical stimulation and tumbling affect pre-rigor cured, sectioned and formed ham roasts.** *Journal of Food Science* 57(3): 1992: 564-568, 616

Nuggets

1684

Rhee (KS), Housson (SE) and Ziprin (YA). **Enhancement of frying oil stability by a natural antioxidative ingredient in the coating system of fried meat nuggets.** *Journal of Food Science* 57(3): 1992: 789-791

Poultry

1685

Singh (SN), Karwande (PP), Borgaonkar (PW) and Kothary (HN). **Management of poultry health.** *Poultry Guide* 29(4): 1992: 53-59, 62

The need for the development of disease free envirnoment in the poultry house, the application of sound management practices, disease control and prevention through vaccination are stressed. Some of the important poultry diseases have been listed along with the causative agent, symptoms, age at which infusion takes place and the treatment. These include Aspergillosis, Avian influenza, Avian encephaomyelitis, Fowl cholera, Fowl poxs, Coccidiosis and others. To combat these diseases, various types of vaccines available are also given. GS

1686

Verma (S). **Emerging trends in poultry processing.** *Poultry Guide* 29(4): 1992: 65-69

The paper suggests that mechanization of broiler industry will lead to sophistication and advantages. Mechanization at different stages of transportation and processing such as pre-slaughter holding of birds: catching and transportation of broiler: hauling of broilers on overhead conveyor line: killing and bleeding: scalding and defeathering: evisceration: chilling, packaging: freezing and storage are covered. GS

Chickens

1687

Thayer (DW), Dickerson (CY), Ramkishan Rao (D), Boyd (G) and Chawan (CB). **Destruction of *Salmonella typhimurium* on chicken wings by γ-radiation.** *Journal of Food Science* 57(3): 1992: 586-589

Irradiation of poultry wings to 1.5 kGy greater than equal to 3.0 kGy provide significant protection against the presence of *Salmonellae* and reduce the population of indigenous microflora. SRA

Broilers

1688

Xiong (YL). **Thermally induced interactions and gelation of combined myofibrillar protein from white and red broiler muscles.** *Journal of Food Science* 57(3): 1992: 581-585

The gelling properties of broiler myofibrillar protein were studied by determining protein-protein interactions during heating. Breast and leg salt-soluble protein (SSP) showed 1-3 transitions in protein-protein interactions within pH 5.5-6.5. The max. transition temp. of leg SSP decreased when leg SSP was mixed with breast SSP. The combined breast/leg myofibrils formed stronger gels than leg myofibrils alone at pH greater than or equal to 6.0, and stronger gels than breast myofibrils alone at pH < 6.0. The results suggest that interactions existed between breast and leg myofibrillar proteins, and the transitions in these interactions were useful for predicting gel strength of the combined breast/leg myofibrils. AS

Ducks

1689

Lesiow (T). **Comparison of changes occurring in rheological properties of gelled tissue and model sausage prepared from duck breast muscles stored at -2 C and -18 C.** *Die Nahrung* 34(10): 1990: 927-933

Quails

1690

Renu Kumari and Mushtari Begum (J). **Sensory evaluation and microbiological quality of quail meat products.** *Indian Journal of Poultry Science* 26(3): 1991: 189-190

Microbial load on the fresh raw quail meat and its products like tandoori and battered quail at 6, 12 and 18 wk of age was studied. Quail pieces were stuffed with tandoori masala or dipped in the paste (prepared by adding spices, curd and corn starch) and kept in the refrigerator for 2 h for absorption. The pieces were deep fat fried in the cooking oil till they turned to brown colour and became crisp. Among these the products made from 18 wk old quails was highly acceptable although the age of the bird did not influence the acceptability of tandoori and battered quail. Between the products, the battered quail had less bacterial load than the tandoori quail. Bacterial load in the product increased with the advancement of the age of the quail meat from which they were prepared. The bacterial load on raw meat was higher than the products prepared from quail meat of similar age. GS

Turkeys

1691

Pruett (WPJr), Graham (PP), Marcy (JA) and Marriot (NG). **Microbial characteristics of flaked and colour-modified turkey thigh meat.** *Journal of Food Science* 57(3): 1992: 590-592, 621

Aerobic and psychrotropic microbial counts were not different ($P > 0.05$) between intact thigh and 1-day flaked turkey (FT) or between flaked turkey and colour modified turkey (CMT) at any sampling interval. Mean coliform levels in FT did not differ ($P > 0.05$) from those in CMT after 1 day at 3 C properly performed flaking and colour modification do not compromise the microbial quality of turkey. BV

1692

Line (JE) and Harrison (MA). ***Listeria monocytogenes* inactivation in turkey rolls and battered chicken nuggets subjected to simulated commercial cooking.** *Journal of Food Science* 57(3): 1992: 787-788, 793

Cured and uncured turkey rolls inoculated with 10^7 *Listeria monocytogenes* CFU/g were vacuum packed and cooked to internal temp. of 68 and 74 C respectively and stored up to 15 wk at 4 C. Battered chicken nuggets enclosed in bags were cooked under moist heating condition in a oven to an internal temp. of 71 C. Nuggets were flushed with 30% CO_2, 70% N_2 atm. and sealed, and stored up to 30 days at 4 C. No *L. monocytogenes* were recovered from the cooked products suggesting that similar commercial processes are adequate to reduce populations of *L. monocytogenes* below detection limits. SRA

Poultry products

Eggs

1693

Akita (EM) and Nakai (S). **Immunoglobulins from egg yolk: Isolation and purification.** *Journal of Food Science* 57(3): 1992: 629-634

1694

Ikura (K), Higashiguchi (F), Kitabatake (N), Doi (E), Narita (H), Sasaki (R). **Thermally induced epitope regions of ovalbumin identified with monoclonal antibodies.** *Journal of Food Science* 57(3): 1992: 635-639

1695

Arntfield (SD) and Murray (ED). **Heating rate affects thermal properties and network formation for vicilin and ovalbumin at various pH values.** *Journal of Food Science* 57(3): 1992: 640-646

The impact of heating rate on the strength and type of networks formed with ovalbumin and vicilin were investigated at three pH levels. Changes in protein conformation and structure development were monitored with differential scanning calorimetry (DSC) and dynamic rheology. Networks were characterized by rheological properties and microstructure. Under conditions which promoted the formation of well crosslinked networks, slower heating rates resulted in stronger networks but had little impact on the type of network. As conditions were shifted to promote aggregation rather than network formation, the impact of heating rate was reduced so that for both ovalbumin and vicilin at pH 5, network characteristics were essentially independent of heating rate. AS

1696

Jarnail Singh. **Better management practices reduce egg breakage.** *Poultry Guide* 29(5): 1992: 33-34

Factors like Ca intake, age and breed of birds can improve the shell formation. Better management of poultry shed, packaging and handling practices can reduce the breakage during post lay periods, which varies between 12-15%. Selection of a good layer strain and followed by a good vaccination programme will reduce breakage. Blowing extra air over the birds helps to keep them cool and avoid panting which is essential for good shell eggs. One nest for each four or five birds should be provided and egg laying on flour should be eliminated. These are the practices to be followed to reduce egg breakage. GS

1697

Mohan (B), Thyagarajan (D), Rangareddy (P), Nagarajan (S) and Ramamurthy (N). **Assessment of quality characteristics of commercial chicken eggs.** *Indian Journal of Poultry Science* 26(3): 1991: 191-192

The chicken eggs marketed in Namakkal town, Tamil Nadu, India were assessed by the external and internal qualities. The eggs marketed are of medium size. The mean shape index was lower than the normal and the sp. gr. was nearer to normal. The albumen and yolk indices and the Haugh units of eggs were below normal values. The av. shell thickness concurred with the normal values. The albumen pH increased due to the loss of CO_2 from the eggs during storage. The mean values for shell %, albumen % and yolk % were within the normal values. GS

SEAFOODS

1698

Unger (J) and Wagner (H). **Temperature arrangement in the storage process of refrigerated sea-water and board. (Part VII).** *Lebensmittelindustrie* 37(5): 1990: 222-223 (De)

Fish

1699

Pozzo (F), Gainfaldoni (D), Tana (L), Sassetti (M) and Bono (GCD). **Contamination by Cs-137 in fish and decontamination systems.** *Industria Conserve* 66(2): 1991: 136-140 (It)

The aspects regarding contamination by Cs-137 and the efficacy of some decontamination process both in whole fish (immersion in clear water) and in fish muscle tissue (pickle, marinade) is reported. BV

Cod

1700

Jahncke (M), Baker (RC) and Regenstein (JM). **Frozen storage of unwashed cod (*Gadus morhua*) frame mince with and without kidney tissue.** *Journal of Food Science* 57(3): 1992: 575-580

The removal of kidney tissue from Atlantic cod (*G. morhua*) before deboning eliminated typical "chemical" and "petroleum" type flavours and resulted in a white ($P < 0.05$), less red and higher quality unwashed cod frame mince. Samples without kidney tissue had good frozen storage stability (at -40 C) and could be used as an ingredient in meat products. Combination of kidney tissue removal and low temp. storage were important for producing higher quality unwashed cod frame mince. SRA

1701

Ablett (RF) and Gould (SP). **Subcellular membrane integrity of Atlantic cod (*Gadus morhua*) myotomal tissue: Effects of frozen storage.** *Journal of Food Science* 57(3): 1992: 796-799

The influence of frozen storage on the ultrastructural integrity of Atlantic cod muscle tissue membranes was investigated following 3 methods of freezing and retention for 12 wk at -12 C and -35 C. In comparison to controls (0 wk), extensive membrane condensation associated with sarcoplasmic reticulum was apparent in samples stored for 12 wk at -12 C. The effects were observed to a much lesser extent in samples retained for 12 wk at -35 C. It was apparent that cryogenic, plate or blast freezing techniques showed no measurable influence on the observed condensation and that such ultrastructural changes resulted as a consequence of relatively high (-12 C) subfreezing temp. AS

1702

Shahidi (F), Naczk (M), Pegg (RB) and Synowiecki (J). **Chemical composition and nutritional value of processing discards of cod (*Gadus morhua*).** *Food Chemistry* 42(2): 1991: 145-151

Cod offal from Atlantic sp. showed 14.3% crude protein (inclusive of 2.55% collagen), 4.3% total lipid, 3.95% ash and 413 kJ/100g energy value. Based on selected amino acids the PER values were 1.88 - 2.36 for offal, 2.86 - 3.24 for cod muscle, higher content of glycine, alanine, serine, proline, hydroxy-porline and comparable fatty acids for offal. SD

Pollack

1703

Fiddler (W), Pensabene (JW), Gates (RA), Hale (M) and Jahncke (M). **N-nitrosodimethylamine formation in cooked frankfurters containing Alaska pollock (*Theragra chalcogramma*) mince and surimi.** *Journal of Food Science* 57(3): 1992: 569-571, 595

Studies were conducted to determine the feasibility of using Alaska pollock mince as a partial substitute for red meats in the formulation of frankfurters. Studies included the effects of fish form (unwashed and washed mince and surimi), percentage substitution (15 and 50) and five different methods of cooking the fish-meat franks on their N-nitrosodimethylamine (NDMA) content. The amount of formed NDMA depended on the method of cooking. Broiling and frying generated the highest levels. Microwave and boiling generated the lowest levels of NDMA, which were equivalent to the level in uncooked franks. Broiling was observed to increase the amount of dimethyl- and trimethylamine formed. AS

1704

Pavlova (LA), Damshkaln (LG) and Vainerman (ES). **Effect of acetylation on rheological properties of fish protein isolates during heating.** *Die Nahrung* 35(1): 1991: 53-59

Results of this study indicate that regardless of the acetylation degree the protein isolates from pollack muscular tissue retain the ability to thermal gelation at temp. above 65 C. The effect of the acetylation is quite significant in the range of moderate temp. of 40-60 C; isolates acetylated to 50% and 70% display the tendency to form gel structures, but the fully acetylated proteins on the contrary acquire max fluidity under these conditions and form gels at prolonged incubation of dispersions with a high concn. only. BV

Salmon

1705

Sollid (H) and Solberg (C). **Salmon fat content estimation by near infrared transmission spectroscopy.** *Journal of Food Science* 57(3): 1992: 792-793

Near infrared transmission (NIT) spectroscopy spectrum in the region 850-1050 nm was used for prediction of the fat content in fresh salmon fillets. The square error of prediction was 0.49%, and the correlation between measured and predicted fat from the NIT-spectrum was 0.99. The only sample preparation needed was simple homogenization of the fillet prior to analysis. AS

1706

Previdi (MP), Ambroggi (F) and Gola (S). **Behaviour of *Listeria monocytogenes* in smoked salmon. Detection of *Listeria* spp., *Aeromonas hydrophila* and *Yersinia enterocolitica* in smoked fish.** *Industria Conserve* 66(2): 1991: 109-111 (It)

A microbiological study of 56 samples of different vacuum-packed smoked fish showed the presence of *L. monocytogenes* in one sample of sword fish and *L. innocua* in one of salmon and the absence of *Y. enterocolitica* and *A. hydrophila*. BV

Trout

1707

Rounds (RC), Glenn (CL) and Bush (AO). **Consumer acceptance of brown trout (*Salmo trutta*) as an alternative species to rainbow trout (*Salmo gairdneri*).** *Journal of Food Science* 57(3): 1992: 572-574

Rainbow trout and brown trout were prepared and distributed to consumers for comparative taste tests to determine consumer reaction to brown trout. In-home tests were standardized with paired samples of fish. Colour of flesh, odour, flavour, texture and overall acceptability were recorded on a 9-point Hedonic scale. Sensory results indicated that brown trout raised in farm stock ponds were more acceptable than rainbow trout from similar environments, and rainbow trout from natural winter-kill lakes were more acceptable than brown trout from the same or similar lakes. Overall, it was concluded that brown trout would be acceptable to consumers. Variations in acceptability related to water body of origin rather than to species of fish. Significant differences occurred in some characteristics but were inconsistent as to species. AS

Tuna

1708

Lo (J-R), Nagashima (Y), Tanaka (M), Taguchi (T) and Amano (K). **Effect of ultrasonication on the thermal gelation of ordinary and dark meat pastes from yellowfin tuna.** *Journal of Japanese Society for Food Science and Technology (Nippon Shokuhin Kogyo Gakkaishi)* 38(6): 1991: 540-544

1709

Garcia Arias (MT), Castrillon (AM) and Navarro (MP). **Changes in white tuna (*Thunnus alalunga*) fat due to canning process and storage preserve.** *Grasas y Aceites* 42(3): 1991: 179-186 (Es)

Modifications in fatty acid composition in white tuna (*Thunnus alalunga*) occuring at each stage of the canning process, boiling and sterilization in soybean oil, were studied. Boiling was performed in brine and two sterilization times (55 and 90 min.) as well as the effects of storage for one yr were tested. Boiling had no effect on fatty acid composition or the n-3/n-6 ratio. However canned tuna absorbed soybean oil during sterilization, causing an increase of the percentage of C18:1, C18:2 and C18:3 and a decrease in C20:5 and C22:6. Therefore, unsaturated fatty acids to saturated fatty acids (PS/S) ratio changed and the n-3/n-6 ratio declined from 7.03 to 0.59 compared with raw tuna. Due to the whole fat enrichment, canned fish showed a slight loss of PUFA (C20:5 and C22:6) and a increase of C18:1, C18:2 and C18:3. The latter effect was more marked in the preserves as a consequence of one yr storage. The convenience of using for canning an oil containing a lower amount of polyunsaturated fatty acid in order to remain the original n-3/n-6 ratio of the raw tuna is discussed. AS

Products

Fish oil

1710

Tulsner (M), Andree (S) and Meusel (D). **Poly-unsaturated fatty acids (PUFA) and the production concentrates from fish oil. (Part II).** *Lebensmittelindustrie* 37(5): 1990: 224-226 (De)

Surimi

1711

Ramachandran (A) and Gopalakrishna Iyer (TS). **Processing and quality standards of surimi in Japan.** *Seafood Export Journal* 24(2): 1992: 5-10

Surimi is minced and washed meat produced from any kind of fish, used as a base for producing other fishery products. Alaska pollack is the most commonly used fish for surimi production. The two methods adopted for producing frozen surimi are described and the quality standard adopted in Japan for general surimi: surimi frozen with salt and without salt are tabulated. SRA

PROTEIN FOODS

Nil

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Alcoholic beverages

Beer

1712

Ernszt (M). **Spectrophotometric determination of phenol in wort and beer.** *Lebensmittelindustrie* 37(5): 1990: 206-208 (De)

1713

Grutzmacher (J). **The biological acidification in the brewing process-method to improve the quality of beer (II).** *Lebensmittelindustrie* 37(5): 1990: 210-212 (De)

Wines

1714
Gordillo (CM), Iglesias (JLM) and Exposito (JM). **Autolysis of *Saccharomyces bayanus* during the production of cava. Part I. Proteolysis in wines.** *Die Nahrung* 34(10): 1990; 969-972

Proteolysis is a complex phenomenon corresponding to enzymatic hydrolysis of intracellular biopolymers, following cell death. The combined enzymatic action of proteases and other enzymes which modify the structure and porosity of membranes and cell walls during the autolysis of yeasts, release into the medium different molecules such as nucleotides, proteins, peptides, vitamins and amino acids which constitute precursors of specific organoleptic properties of Cava wines produced with the Champenoise method. Several authors, when studying the mechanism of yeast autolysis, point to an initiation stage consisting of membrane denaturization and a phase of cellular activation or autolytic phase which corresponds to the enzymatic hydrolysis of intracellular macromolecules. In this paper the extracellular and intracellular proteasic activities occurring during the production of Cava wines with *Sacch. bayanus* (Champenoise method), and the influence of autolytic factors (pH, ethanol and temp.) are studied. AS

1715
Puchades (R), Herrero (MA), Maquieira (A) and Antienza (J). **Simultaneous enzymatic determination of L(-) malic acid and L(+) lactic acid in wine by flow injection analysis.** *Food Chemistry* 42(2): 1991: 167-182

Non-alcoholic beverages

Fruit juices

Grape fruit juices

1716
Hernandez (E), Couture (R), Rouseff (R), Chen (CS) and Barros (S). **Evaluation of ultrafiltration and adsorption to debitter grapefruit juice and grapefruit pulp wash.** *Journal of Food Science* 57(3): 1992: 664-666, 670

Removal of limonin and naringin from grapefruit juice can be efficiently accomplished with hydrophobic resin XDA-16. Removal of naringin in grapefruit pulp wash was less efficient and required a higher resin vol. to absorb similar amounts of naringin from pulp wash than juice. Debittering processes improved the flavour of grapefruit pulp wash. Temp. had no effect on the adsorption of limonin. However, the adsorption of naringin was less effective at low temp. The resin XAD-16 is capable of adsorbing other flavonoids such as hesperidin and narirutin. SRA

Orange juices

1717
Ekasari (I), Honenderboom (CJM), Jongen (WMF) and Pilnik (W). **The use of an automated system for mutagenicity testing to assess the inner quality of heat-treated orange juices.** *Food Chemistry* 42(2): 1991: 203-212

Data provided by Cobas Bact analyser indicated that endogenous growth factors (histidine in juice and cytotoxic effects in heated juice) disturb the turbidometric assay system. Gel filtration and HPLC gave good results but the automated system may be useful to screen fractions for identification of mutagenic Maillard intermediary products. SD

Tea

1718
Kathiresan (K) and Pandian (M). **Effect of UV on quality of black tea from *Ceriops decandra*.** *Science and Culture* 57(3/4): 1991: 93-95

The quality of black tea was higher in monsoon samples than in summer samples and the trend was pronounced in samples fermented under UV irradiation for 90 - 150 min. It might be due to the higher enzyme activity of polyphenol oxidase and availability of substrates, polyphenols. SD

FATS AND OILS

1719
Hellwing (M), Morsel (J-Th) and Tulsner (M). **Lipoxygenase - their importance in lipid chemistry.** *Die Nahrung* 34(5): 1990; 449-463 (De)

The importance of lipoxygenase and its effect on food systems and reaction products generated during catalysis and enzymic processes both proceeding and following lipoxygenase reaction is highlighted. BV

1720
Pokorny (J). **Influence of lipid alteration on taste and flavour of foods.** *Die Nahrung* 34(10): 1990; 887-897 (De)

Under the conditions of food preparation and storage three various processes take place in the lipid fraction which affect flavour and taste: 1. hydrolytic, 2. oxidative, 3. pyrolytic processes. The first two may also be catalyzed enzymatically. Hydrolysis as well as oxidation have a favourable influence on the flavour. If the products, however, are formed in higher concn. they mostly cause a negative impression of a beginning rancidity. These processes leading to rancidity should be inhibited, especially during storage. AS

1721

Bariszlovich (M), Meusel (D) and Tulsner (M). **Characterization of microbial lipases. Part 2. Determination of lipase specificity.** *Die Nahrung* 35(1): 1991: 61-69 (De)

Types of lipase specificity are as follows: Positional specificity; fatty acid specificity; stereospecificity; substrate specificity (different rates of lipolysis of different glyceride classes). The acylglycerol used for detn. of lipase specificity must be so structured, that specificities are not condused and unambiguous results are obtained. Different substrates and methods for detection of specificity are reviewed and advantages and disadvantages are discussed. Positional specificity can be determined with synthetic dialkylacylglycerols and 2,3-dioleoyl butanediol. Stereospecificity can be detected with enantiomeric dialkylacylglycerols or diacylalkylglycerols. AS

Fats

1722

Rohm (H) and Raaber (S). **Difference thresholds in texture evaluation of edible fats: Firmness and spreadability.** *Journal of Food Science* 57(3): 1992: 647-650, 663

Weber ratios for firmness and spreadability of edible fats were determined at six stimulus intensities with the appropriate instrumental methods being sectility testing and cone penetration, respectively. The results provided good support for Weber's law except, in the case of firmness, for deviations at low stimulus intensities. The derived just noticeable difference scales approximated Fechner's law. In the linear range the mean Weber ratios were 0.196 for firmness and 0.272 for spreadability. Individual differences among the subjects up to 50% were observed. The results of previous magnitude estimation experiments and the present study suggest that firmness and spreadability are prothetic continua and that the just noticeable differences increase with increasing stimulus intensity. AS

1723

Singhal (RS), Gupta (AK) and Kulkarni (PR). **Low-calorie fat substitutes.** *Trends in Food Science and Technology* 2(10): 1991: 241-244

This article briefly describes and compares the major fat substitutes that have been developed to date. Covers 'engineered' fats and oils, carbohydrate-based fat substitutes (gums, polydextrose, starch derivatives, microcrystalline cellulose) protein-based fat substitutes and problems associated with fat substitutes. BV

1724

Anon. **Survey by a working party of the DGF, 117th report: Steaming of edible fats and oils for deodorization and deacidification.** *FAT Science Technology* 92(12): 1990: 459-463 (De)

1725

Vranac (K), Vrbaski (Z) and Budincevic (M). **Improvement of fluid acetylated monoglycerides.** *Lebensmittelindustrie* 37(5): 1990: 200-201 (De)

1726

Diedrich (M) and Henschel (K-P). **The natural occurrence of unusual fatty acids. Part 1. Odd numbered fatty acids.** *Die Nahrung* 34(10): 1990: 935-943

A literature review of the natural occurrence and effects of odd numbered fatty acids (C_{11} to C_{33}) in microorganisms, plants and animals is presented. Not only saturated and unsaturated odd numbered fatty acids but also unsaturated fatty acids with unusual position of double bonds seem to be ubiquitous in small amounts. 88 references. AS

1727

Deidrich (M) and Henschel (K-P). **The natural occurrence of unusual fatty acids. Part 2. Even numbered fatty acids with unusual position of the double bond.** *Die Nahrung* 35(1): 1991: 85-95

Review. 87 references. BV

Shea butter

1728

Mendez (MVR), Lope (JH), Pereda (J) and Dobarganes (MC). **Assays for physical refining of shea butter.** *Grasas y Aceites* 42(2): 1991: 121-126 (Es)

The best conditions for the refining of shea butter used in cosmetic industrues are defined. The

objective is to obtain a belached, deodarized fat, with a 3% max free fatty acidity and a high amount of unsaponifiable matter having minimal losses with respect to the initial sample. The following variables have been studied: phosphoric acid proportion in degumming, bleaching clays and active carbon percentages in bleaching, and temp./time in the stage of deodorization. The results demonstrate that good quality shea butter can be obtained by physical refining if the level of free fatty acid in the initial sample is lower than 5%. Otherwise, a neutralization is necessary, which should be partial in order to reduce the loss of unsaponifiable matter. AS

Oils

1729

Zhang (WB) and Addis (PB). **Evaluation of frying oil filtration systems.** *Journal of Food Science* 57(3): 1992: 651-654

Three heated oil filtration systems were evaluated: (1) paper filter: (2)paper filter plus diatomaceous earth (DE): and (3) depth filtration with a filter pad under positive pressure. Methods 1 and 2 are traditional methods. Results on tallow-cottonseed oil (90:10) and hydrogenated soybean shortening indicated that depth filtration was more effective at maintaining lipid oxidation products at low levels than methods 1 and 2. Levels of free fatty acids did not appear to differ markedly between treatments in both comparisons of depth filtration with traditional methods. Mineral analysis of both heated oil filtrate and residue removed from oil by filters revealed that depth filtration was more effective at removal of pro-oxidant transition metals than were methods 1 and 2. AS

1730

Shimada (K), Kawano (K), Ishii (J) and Nakamura (T). **Structure of inclusion complexes of cyclodextrins with triglyceride at vegetable oil/water interface.** *Journal of Food Science* 57(3): 1992: 655-656

The interfacial tension of vegetable oil (soybean oil or coconut oil)/water interface decreased with the increase of cyclodextrin (CD) concn. The interfacial excess and interfacial area were calculated from the Gibbs' adsorption equation. The average number of CD molecules including a fatty acid residue of soybean oil at the interface was estimated at 2.4 for each of α-CD and β-CD. The average number of CD molecules complexed with a fatty acid residue of coconut oil was 1.8 for α-CD and 1.7 for β-CD. These results suggested that the CD molecules formed the inclusion complex with the triglyceride according to the chain length of fatty acid residue at the interface. AS

1731

Vrbaski (Z), Livada (M), Vranac (K), Budincevic (M) and Backovic (M). **Effects of addition of phosphatides on the formation of peroxides in hydrogenated oils.** *Die Nahrung* 34(10): 1990: 875-880 (De)

The oxidation stability of vegetable fats (m.p. 28 - 30.5 C), containing totally hydrogenated fats (iodine number up to 1.0) and lecithin, was studied. The effects studied are the concn. of additives and previous thermostating at 150 C for 60 min. The samples containing lecithin showed an increased oxidation stability at 98 and 110 C. AS

1732

Farag (RS), Hewedi (FM), Abo-Raya (SH) and El-Baroty (GSA). **A comparative study on the deterioration of oils by microwave and conventional heating.** *Grasas y Aceites* 42(3): 1991: 187-193

Exposing the refined cottonseed oil (RFO) and hydrogenated palm oil (HPO) to various heating times and microwave oven power caused hydrolysis of free fatty acids, accelerated the formation of hydroperoxides and secondary oxidation products. The development of rancidity for RFO heated by microwaves was twice faster than that produced by conventional heating. Also, the chemical values for refined cottonseed oil were much higher than that of HPO in all cases. BV

1733

Tirtiaux (A). **Dry multiple fractionation - A low cost modification process.** *FAT Science Technology* 93(11): 1991: 432-439 (De)

This paper updates the state of one technology developed by Tirtiaux, including both crystallization and separation sections. The theory of crystallization is also reviewed with regard to palm oil, milkfat, tallow, hardened fish and soybean oil etc. Finally, emphasis is made on the lower cost when replacing hydrogenation with a process involving multiple fractionation. BV

Butter oil

1734

Hammam (H), Soderberg (I) and Sivik (B). **Physical properties of butter oil fractions obtained by supercritical carbon dioxide extraction.** *FAT Science Technology* 93(10): 1991: 374-378

Butter oil has been fractionated with supercritical carbon dioxide at 40 C, 125 bar and 350 bar, respectively. The chemical composition and physical properties of the butter oil fractions have been studied with GC and differential scanning calorimetry (DSC). The polymorphism of the fractions has been studied by X-ray diffraction during crystallization. Fractionation carried out at lower extraction pressure results in higher selectivity. The first fractions collected during the extraction process contain triglycerides which are enriched in short chain fatty acids. The colourless fractions melt and crystallize at a lower temp. compared to the original butter. The residual fraction is enriched in triglycerides with long chain fatty acids, is yellow, melts and crustallizes at a higher temp. All the investigated fractions shows the β' form when crystallized from the melt. AS

SPICES AND CONDIMENTS

Spices

1735

Tietz (U) and Thomann (R). **The profile analysis-method of the sensoric evaluation of spices.** *Lebensmittelindustrie* 37(5): 1990: 202-204 (De)

1736

Sambaiah (K) and Srinivasan (K). **Effect of cumin, cinnamon, ginger, mustard and tamarind in induced hypercholesterolemic rats.** *Die Nahrung* 35(1): 1991: 47-51

The results of the present study indicate that the spices-cumin (*Cuminum cyminum*) cinnamon (*Cinnamomum zeylanicum*), ginger (*Zingiber officinale*), mustard (*Brassica nigra*) and tamarind (*Tamarindus indica*) do not have any beneficial cholesterol lowering effect when consumed at dietary levels tried (5-fold the normal human intake level). BV

Fenugreek

1737

Osman (MK) and Simon (LS). **Biochemical studies of some non-conventional sources of protein. Part 5. Extraction and characterization of protein from fenugreek seed (*Trigonella foenum* L.).** *Die Nahrung* 35(3): 1991: 303-308

Protein concentrates were prepared from fenugreek seeds by extraction with distilled water, salt solution and alkaline solution. Alkaline solution resulted in the highest extraction yield (82%). The protein concentrate has a good digestibility (over 90%) as determined by *in vitro* enzymatic method. The protein is rich in lysine (6.51%) but poor in sulphur-containing amino acids such as methionine (0.71%), cystine (1.09%) and tryptophan (1.03%). AS

Saffron

1738

Iborra (JL), Castellar (MR), Canovas (M) and Manjon (A). **TLC preparative purification of picrocrocin, HTCC and crocin from saffron.** *Journal of Food Science* 57(3): 1992: 714-716, 731

A method for the extraction and purification of saffron secondary metabolites was developed. Among the solvents checked water was the most convenient for picrocrocin, 2,6,6-trimethyl-4-hydroxy-1-carboxaldehyde-1-cyclohexane (HTCC) and crocin extraction from saffron stigmas. The compounds were separated by analytical and preparative thin layer chromatography on aluminum oxide, and identified by spectroscopic techniques. Quantitative detn. was performed by HPLC methods with reverse phase C-18. Picrocrocin, HTCC and crocin isolated by preparative TLC showed a chromatographic purity of 98%, 96% and 70%, isolation yields being 88, 98 and 70%, respectively. The isolated compounds may be useful as food colourants. AS

SENSORY EVALUATION

1739

Tepper (BT) and Genillard-Stoerr (A). **Chemosensory changes with aging.** *Trends in Food Science and Technology* 2(10): 1991: 244-246

This review examines the chemosensory (taste, odour perception) changes that occur with aging and their possible causes and consequences and suggests alternatives for enhancing the appeal of food to elderly people. Aspects covered include: changes in taste perception, odour perception, causes of chemosensory losses, consequences of decreased chemosensory function and approaches to enhancing the chemosensory appeal of foods. 33 references. BV

1740

Daget (N) and Joerg (M). **Creamy perception. II. In model soups.** *Journal of Texture Studies* 22(2): 1991: 169-189

Optimum consistency of soups with different thickners were at 57 - 106 mPas viscosity: flow

behaviour index between 0.12 - 0.57: maxima creaminess at 90 - 325 mPas viscosity and flow behaviour index between 0.12 - 0.42. Perceived panel thickness showed linear relationship to the logarithm of viscosity and liking consistency quadratic relation with viscosity. The optimal values of viscosity and flow behaviour index for max creaminess and best liking consistency did not coincide. SD

1741
Richez (C) and Sauvageot (F). **Effect of repeated ingestion of water and solid sucrose on the differential sensitivity to sucrose and aspartame.** *Journal of Sensory Studies* 6(1): 1991: 1-16

The differential sensivity to sucrose or aspartame in water was studied by sequential method for water ingestion and solid sucrose ingestion every 5 min. between 9 - 12 noon. Unlike water, the ingestion of solid sucrose had maintained discriminant ability on assessors, may be due to metabolic, hedonic or others. SD

1742
Petty (MF) and Scriven (FM). **The use of Fourier analysis to compare the sensory profiles of products.** *Journal of Sensory Studies* 6(1): 1991: 17-23

Sixty female consumer panel evaluated liking for flavour and appearance, overall liking, natural flavour and odour, creaminess and water, flavour of 3 coffee whiteners and fresh milk using a 100 mm graphic scale anchored at either end. Fourier analysis showed that whitener whose profile was significantly different from that of milk was identified by Fourier plot, which could not be done by traditional univariate methods like multiple regression, principal component analysis and discriminant analysis. SD

1743
King (BM) and Arents (P). **A statistical test of consensus obtained from generalised procrustes analysis of sensory data.** *Journal of Sensory Studies* 6(1): 1991: 37-48

Matrix of maximal agreement produced by matrix matching techniques (e.g. Generalised Procrustes Analysis) represents graphically samples in consensus plots. In order to qualify this consensus as a picture of the consensus among panelists, a statistical test using Monte Carlo approach is demonstrated with a sensory profiling data of fruit flavours. SD

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

1744
Giga (DP) and Canhao (JSr). **Relative toxicity and persistence of pyrethroid deposits on different surfaces for the control of *Prostephanus truncatus* (Horn) and *Sitophilus zeamais* (Motsch.).** *Journal of Stored Products Research* 27(3): 1991: 153-160

Glass, jute, plywood panels and blocks of mud were treated with permethrin (e.c.) and deltamethrin (e.c.and s.c.) at doses ranging from 0.05 to 0.5 a.i.m^{-2}; and their persistance and activity against *P. truncatus* (Horn) and *S. zeamais* (Motsch) were compared. Deltamethrin s.c. was most effective on all surfaces against both insect species. *S. zeamais* was less susceptible to the pyrethroids than *P. truncatus*. BV

1745
Rameshbabu (M), Jayas (DS) and White (NDG). **Mortality of *Cryptolestes ferrugineus* (Stephens) adults and eggs in elevated carbon dioxide and depleted oxygen atmospheres.** *Journal of Stored Products Research* 27(3): 1991: 163-170

The mortality of adult insects was higher than eggs in an atm. containing 68 - 91.7% CO_2, 0 - 5.0% O_2 and the balance N_2 in a given exposure period. The mortality of eggs was more influenced by a decrease in O_2 from 4 - 0% than was the mortality of adults, whereas an increase in CO_2 from 68.0 - 91.7% increased adult mortality more than that of eggs. Atm. comp. (CO_2, O_2 and N_2) and rh (60 - 84%) affected the mortality of eggs and adults more than the other variables. Max mortality for both adults (99%) and eggs (85%) was obtained at high CO_2 (88 - 91.7%), low O_2 (0 - 0.5%), high temp. (19.5 - 20.5 C) and low rh (60.0 - 63.9%) at an exposure of 96 h. BV

1746
Rosen (P), Oestreich (R) and Tschope (D). **Vitamin E and diabetes.** *FAT Science Technology* 93(11): 1991: 425-431

1747

Nnanna (IA) and O'Neill (KL). ***In vitro* binding of vitamin E to selected dietary fiber sources.** *Journal of Food Science* 57(3): 1992: 721-725

An *in vitro* method was used to assess interaction between whole fiber (WF) sources and vitamin E under simulated physiological conditions (pH 2, pH 7, pH 2-7; bile salt 5.15 mM; 37 C). Dose-response and binding characteristics (via Scatchard analysis) were examined. Binding of vitamin E by lupin and gum were higher (p less than or equal to 0.05) at pH 2 and pH 7 than at the sequential treatment. Oat bran, treated at pH 7 or sequentially, showed increased (p less than or equal 0.05) binding of vitamin E as fiber level increased (25 - 100 mg). Scatchard plots revealed two specific noninteracting binding sites for sugarbeet and barley bran. Affinities (K_d) and capacities (n) were compared among fibers. Affinities for vitamin E were: sugarbeet > oat > lupin > barley > gum. Capacities were: barley > gum > lupin > sugarbeet > oat. Vitamin E binding to DF is complex, multifactorial, and not due to a single mechanism. AS

1748

Zunft (H-J). **Food intolerance. Part I: Food as cause of individually abnormal reactions.** *Ernahrungsforschung* 35(6): 1990: 179-182 (De)

1749

Hwang (J) and Kokini (JL). **Structure and rheological functions of side branches of carbohydrate polymers.** *Journal of Texture Studies* 22(2): 1991: 123-167

In the first part of the review the rheological theories of branched polymers, the rheological properties influenced by branching are discussed covering radius of gyration and intrinsic viscosity, zero-shear viscosity, elastic properties, shear rate dependence of viscosity, extensional viscosity and thermal sensitivity of viscosity. The second part covers the structural features of side branches of carbohydrates (starch, galactomannan, xanthan and pectin) and their effects on the rheological properties. 182 references. SD

1750

Zamora (R), Hidalgo (FJ) and Alaiz (M). **Biochemical changes of lipids in plant foods and feeds. II. Lipid hydroperoxides metabolism.** *Grasas y Aceites* 42(3): 1991: 230-238 (Es)

This review covers the enzymes related to the decomposition or transformation of the lipidic hydroperoxides. Lipoxygenase, hydroperoxide lyase, enal isomerase, alcohol dehydrogenase, aldehyde dehydrogenase, hydroperoxide dehydrase, alene oxide ciclase and 12-oxo-phytodienoic acid reductase in plants are described. 62 references. BV

1751

Kovalev (NI), Karzeva (NJ), Fiterer (VO) and Smolenzeva (A). **Use of a graphic-analytical method for the optimization of multicomponent protein mixtures.** *Die Nahrung* 35(1): 1991: 3-12 (De)

The basis for the composition of protein utilization of mixtures from animal and vegetable foods is shown. The suitability of this method with regard to the amino acid composition of the raw products has been corroborated studying the growth efficiency in rats. The graphic-analytical method suggested makes it possible to ascertain the area in which the combinations of protein-containing foods regarding their protein composition reach almost the optimum. This opens the possibility to arrange food compositions in view of taste pecularities. The method has been performed by means of a computer. AS

TOXICOLOGY

1752

Sivaswamy (SN), Balacharndran (B) and Balanehru (S). **South Indian foods: Contaminants and their effects.** *Bulletin of Environmental Contamination and Toxicology* 47(2): 1991: 251-260

This paper reports the presence of polycyclic aromatic hydrocarbons (PAHs) and zearalenone and mutagenic and genotoxic effects of the South Indian food items. The dry-heated pyrolysed spices (pepper, cumin, aniseeds) showed presence of chrysene, dibenzanthracene (DBA), pyrolysed portion of chapathi, bread toast, cutlet had benzo(a)pyrene (BP), oil-fried salted and sun dried vegetables (chillies, cluster beans, sundakkai) had chrysene and BP, sun dried fishes (ribbon fish, seer fish,) had BP and DBA, decoction made from pyrolysed seeds, leaves (cumin seed, aniseed, dry ginger, mint leaves) had chrysene and DBA, pepper, mustard, heated oil were having chrysene. All the test samples displayed mutagenic activity. SRA

1753

Valletrisco (M), Casadio (S) and Stefanelli (C). **The employment of UV radiations in the destabilizing**

mycotoxin. *Industrie Alimentari* 29(288): 1990: 1111-1112 (It)

FOOD LAWS AND REGULATIONS

1754
Govindan (A) and Shashi Sareen. **Standardization in the field of processed foods.** *ISI Bulletin* 5(9): 1991: 315-318

The various Acts and Rules formulated for monitoring of food standards under the compulsory legislation in India include Prevention of Food Adulteration Act 1954, Essential Commodities Act 1954, Fruit Products Order 1955, Solvent Extracted Oils, Deoiled meal and Edible Flour Control Order 1967 and Vegetable Products Control Order 1976, Standards Weights and Measures (Packaged commodities) Rules 1977, and Export (Quality Control and Inspection) Act 1963. Those dealing with voluntary Standardization and Certification system are Directorate of Marketing and Inspection and Bureau of Indian Standards (BSI). These are described in detail. Indian representation in various International Standardization Agencies and the functions of these Agencies have also been described. SRA

Abdel-Kader (ZM)
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Abia (R)
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Ablett (RF)
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Abo-Raya (SH)
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Ackermann (Th)
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Acuff (GR)
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Addis (PB)
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Ahrens (E)
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Akinyele (IO)
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Akita (EM)
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Alaiz (M)
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Alur (MD)
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Amano (K)
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Ambid (C)
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Ambroggi (F)
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Amiot (MJ)
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Antienza (J)
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Ariga (H)
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Arntfield (SD)
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Balachandran (B)
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Barbeau (WE)
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Barbuti (S)
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Bargman (TJ)
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Barlszlovich (M)
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Barrio (CS)
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Barros (S)
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Basak (S)
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Bassa (IA)
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Baumann (TE)
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Beavis (R)
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Bell (LN)
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Berhow (MA)
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Bernal (JG)
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Berquist (RR)
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Berry (BW)
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Bertolo (G)
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Bhatty (RS)
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Bjarnason (M)
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Bjerke (JM)
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Bono (GCD)
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Borejszo (Z)
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Borgaonkar (PW)
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Bormann (K)
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Bouman (S)
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Boyd (G)
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Brassard (R)
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Brunner (KG)
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Budincevic (M)
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Campanini (M)
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Campos (M)
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Canhao (JSr)
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Cano (MP)
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Canovas (M)
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Carpi (G)
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Casadio (S)
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Castellar (MR)
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Castrillon (AM)
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Castro (AD)
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Chai (E)
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Chandan (RC)
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Chawan (CB)
1687
Chawla (SP)
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Cheftel (JC)
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